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CLEAN AIR

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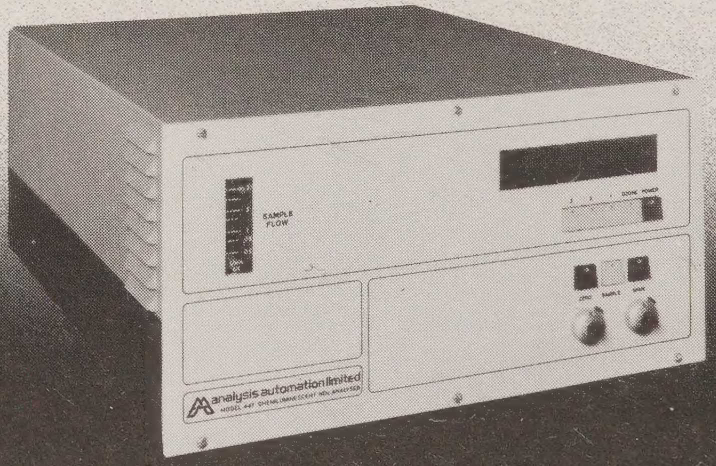

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CLEAN AIR

THE JOURNAL OF THE NATIONAL SOCIETY FOR CLEAN AIR
Vol. 16, No. 1 ISSN 0300-5743 1986

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CLEAN AIR is printed and published quarterly (1986) by the National Society for Clean Air at 136 North Street, Brighton BN1 1RG. Tel: Brighton (0273) 26313.
Publishing Director: Air Commodore J. Langston, CBE, FBIM, Secretary General.
Editor: Jane Dunmore.
Advertising: Peter Mitchell.
Issued gratis to Members and Representatives of Members.
1986 subscription rate for CLEAN AIR — £11.95 post free. Advertising Rates available on application.

CLEAN AIR is the official journal of the Society, but the views expressed in contributed articles are not necessarily endorsed by the Society. Abstraction and quotation of matter are permitted, except where stated, provided that due acknowledgements, including the name and address of the Society are made.

Technical articles of full page length, or over, in CLEAN AIR are indexed in Current Technology Index. Abstracts are included in Environmental Periodicals Bibliography (EPB).

DIVERSE AFFAIRS

A few days before Christmas the Society presented its views on the introduction of lead-free petrol to the Department of the Environment. In brief, the NSCA told the Government not to rely on market forces alone to secure the widespread use of unleaded petrol, but to bring in a range of practical measures to ensure that lead-free petrol and cars that can run on it are introduced as rapidly as possible into the UK. The full text of the Society's submission can be found on page 19. The most important point is the requirement for price adjustments to be made so that unleaded petrol appears an attractive option to the motorist. The NSCA was pleased, therefore, to note the brief reference by the Chancellor in this year's Budget to fiscal concessions that will be made to encourage the use of unleaded petrol. Another recent welcome measure for the further control of lead in the environment has been action on anglers' lead weights, which should ensure their rapid replacement by less toxic alternatives.

Elsewhere in this issue is an account of investigations being conducted by the CEGB into methods of reducing pollution from power stations. We hope that readers will find this paper of considerable technical interest and that it will stimulate a lively debate within these pages about the relative merits of the various techniques under investigation — and, of course, the case for action targetted at reductions in acidic emissions. The introduction to the paper is certainly controversial.

We had hoped to publish in this issue the results of the Society's survey of straw and stubble burning in 1985. Lack of space made this impossible but readers may like to know that the survey results have already been distributed to the local authorities which sent in returns to our questionnaire, and a well-presented booklet containing the survey results *and* a report on alternative methods of straw disposal is shortly to be published by the Society. This will be available free of charge to members, and on sale to non-members. All enquiries to the Society's Information Office.

Finally, as the NSCA has become ever more deeply involved in noise matters, it warmly welcomed the launch in March 1986 of the Noise Council, a joint IoA/IEHO venture supported also by the Royal Environmental Health Institute of Scotland and the Institute of Occupational Safety and Hygiene. The NSCA looks forward to co-operating with this body on many areas of mutual, national interest. Indeed, it is clear from the initial booklet prepared by the Noise Council that it shares many of our concerns. On the international front, the NSCA has been elevated to full membership of the International Association Against Noise and thus has the honour of representing the UK at the International Congresses and other meetings organised by this Association.

METHODS FOR REDUCING EMISSIONS TO AIR FROM POWER STATIONS

by
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INTRODUCTION

In recent years a few technically proven means for reducing the emission of pollutants to air from large power stations have been developed and applied. Further methods are still under development while others still need adaptation to local circumstances before they can be considered for use. These methods of reducing emissions can add considerably to electricity production costs, and they can also reduce the overall efficiency of electricity generation and generate waste products with their own adverse environmental impacts. Thus, before such techniques can be considered for application, it is essential to ensure that the emissions they reduce are a real source of the environmental damage and that a reduction of these emissions is the most cost-effective way, from among the other control methods available, of curing the damage.

The UNECE Convention on Long Range Transboundary Air Pollution defines air pollution as:–

> "the introduction by man, directly or indirectly, of substances or energy into the air resulting in deleterious effects of such a nature as to endanger human health, harm living resources and ecosystems and material property and impair or interfere with amenities and other legitimate uses of the environment".

The definition thus clearly demonstrates that before a release or emission of a substance can be classed as pollution, there must be some clear and obvious damage caused. In many areas of the UK, air concentrations of pollutants have been reduced greatly and in many instances are now so low that little significant damage arises. In such circumstances, further reductions in the emissions of such pollutants are not needed, especially if the high cost of reduction and other consequential effects are remembered.

The complexity of the atmosphere must also be remembered. A reduction in emissions may not necessarily lead to a reduction of the pollution (as defined above) of concern. For example, if pollution problems are experienced in urban areas where air concentrations are dominated by emissions from vehicles, offices, and houses, then reducing emissions from power stations will have little effect. Another example concerns secondary pollution. Work in the UK and USA has shown that reductions in NO_x emissions will not necessarily decrease and may actually increase the air concentrations of ozone. If ozone is the creator of damage (for example to crops or forests), then reducing emissions of NO_x alone may lead to a worsening of the situation.

Reduction of emissions is therefore not a cure for all problems and if wrongly used may generate more problems than it solves. Nevertheless, it is prudent to have emission reduction techniques available and to develop truly cost-effective emission reduction systems. The UK is undertaking much work on such systems at the present time. This work is described below.

The costs quoted in this Report are at March 1983 price levels because this was the base date used for much of the work which was undertaken. It is considered that there is little to be gained in using an index across all values to obtain estimated costs for a later base date.

1. EMISSIONS OF SO_2, NO_x AND DUST

1.1 SULPHUR DIOXIDE

Emissions of sulphur dioxide from all sources in the UK have declined continuously since their peak levels in the early 1970s despite a moderate but continued increase in GDP. The peak of 6.12 million tonnes was reached in 1970 since when they have declined to 3.50 million tonnes in 1984, a reduction of 43%. For 1980, which has been taken as the Base Case year for activities under the UNECE Convention and proposed EEC Directive COM(83)704, the emissions were 4.67 million tonnes and a reduction of 25% has been achieved since that date.

Power stations are the major source of SO_2 emissions in the UK, being some 69% of the total. The peak in emissions from power stations, 3.10 million tonnes, was reached in 1979, since when they have declined 20% to 2.50 million tonnes in 1984. In 1980, the emissions from power stations were 2.87 million tonnes and a reduction of 12% has been achieved since that date.

1.2 NITROGEN OXIDES

In the last decade, emissions of nitrogen oxides (NO_x) from all sources in the UK rose somewhat in the first five years and then declined. The peak of 1.85 million tonnes (expressed as NO_2) was reached in 1979. Since then emissions have declined by about 12% and stood at 1.64 million tonnes in 1983. The decrease since 1980 has been 7%.

The two major sources of NO_x in the UK are power stations and road transport, each accounting for about 40% of emissions. In 1983, UK estimates of emissions from road transport were revised and increased by over 40%. The old calculations used only the fuel burned by motor vehicles, while the new calculations take account of the driving cycles used by those vehicles.

1.3 DUST

Emissions of smoke from all sources in the UK have shown a continuously declining trend. In the last thirty years total emissions have been reduced by a factor of ten. The proportion of emissions attributed to all industry, including power stations, has also reduced across that period from 25% to 12%. Despite reducing their emissions, domestic premises have continued to remain the major source of smoke emissions in the UK.

Total particulate matter emissions from power stations in the UK have also decreased continuously over the last thirty years. Power stations provide only a small percentage of the total particulate matter emitted.

1.4 FUTURE TRENDS

As part of the work under the UNECE Convention on Long Range Transboundary Air Pollution, the UK has announced its intention to further reduce its emissions of SO_2 and NO_x to 30% below their 1980 level by the late 1990s. This is a policy intention and not a formal commitment.

National and international controls already exist on fuel quality including the sulphur content of gas oils and of oils used in power stations. EEC Directives limit the concentrations in air of SO_2, NO_2, dust and lead. Action under these Directives may lead to further reductions in emissions of these substances. Agreement has recently been reached within the EEC on new lower emission standards for CO, HC and NO_x from vehicles.

An EEC Directive of 1984 (84/360/EEC) sets out an authorization system for large combustion installations including power stations. Such installations may only be given authorization if all preventive measures against air pollution have been taken, including the application of the best available technology, provided that the application of such measures does not entail excessive costs. The same Directive requires Member States to implement policies and strategies to adapt existing installations gradually to the best available technology, taking account of the nature and volume of the polluting emissions and the desirability of not entailing excessive costs.

A proposal has been made for an EEC Directive (COM(83)704 and COM(85)47) which, if agreed in its current form, would control the emissions to air of large combustion plant, including power stations. Existing plant, taken all together as a class, would be required to reduce their emissions of SO_2 to 60% below their level in 1980 by 1995. Similarly NO_x and dust emissions would be reduced by 40% each. The same proposal would require emission limits for new plant which correspond to the best technology currently available; more stringent limits would be required for plant licensed after 1995.

2. ACTION ON CONTROLLING EMISSIONS FROM POWER STATIONS

The UK has made substantial progress in reducing its total emissions of SO_2, NO_x and dust. A major part of this reduction has come about by a change of fuels in certain emitting sectors. Part of this change is due to switching from direct combustion of coal to the use of electricity and thereby the indirect combustion of coal at power stations. In the last thirty years improvements have been made in power station combustion efficiency and new fuels such as nuclear power have been developed. As a result the emission of (for example) SO_2 per unit of electricity generated has shown a continuing decline. Over this period it has reduced by over 35% and thereby made a major contribution to the achieved reduction in national SO_2 emissions.

Scientific discussion continues on the causes and effects of acid rain but the exact causes of the damage to forests and lakes are not yet known and, more importantly, cost-effective remedies to this damage have not yet been defined. The UK has a large programme of research on the scientific aspects of acid rain which is designed to examine causes and define remedies. In case this work shows that further reductions in emissions are needed a programme of research into emission reduction technologies is also in progress. This programme will also serve to define the best methods for emission abatement, should this be arbitrarily imposed under international legislation or agreements. The programme is set out below, examining each pollutant and methods for its control, in turn.

2.1 NO_x CONTROL

2.1.1 *Modification of the Combustion Process*

(See Item 6 of Table 1)

In this approach mixing of air and fuel is delayed, and this depresses formation of nitrogen oxides. Depending upon the boiler and the sophistication of the technology applied, reductions of the order of 30 to 50% might be achieved. The principal uncertainties are the possibilities of significantly increased boiler tube failure, the likelihood of which grows with increased level of abatement, reduction in boiler efficiency and deterioration of precipitator dust collection performance. Because of the high chlorine content of UK coals and the relatively tight and differing design of boilers, foreign experience will be of limited value.

Bearing in mind the limitations on burner size and geometry set by existing plant, abatement of the order of 30% would seem a reasonable target for retrofitting in the UK situation, subject to the requirement of maintaining a satisfactory boiler life. The cost of retrofit is about £1.5M for 500 MW units depending upon boiler type and about £2M for 660 MW units. This takes no account of possible modification of mills in the event of needing to change the fineness of grind of the coal fuel. The corner fired boilers are in principle the most readily convertible to low NO_x operation. The wall fired units provide more serious problems. Consequently, development of a low NO_x burner suitable for wall fired boilers is being undertaken and trials are taking place. First results are encouraging in terms of the NOx reduction being achieved but only time will tell if the new burners result in acceptable levels of corrosion, fuel combustion efficiency and cost.

2.1.2 *Flue Gas Denitrification*

In this approach the flue gases are usually reacted over a catalyst with ammonia to remove nitrogen oxides. Very high levels of abatement are possible by this technology; up to 70% has been claimed for some very complex systems, although leakage of ammonia into the flue gases may become a problem at the higher values. There are major uncertainties concerning the life of the catalyst and the feasibility of its regeneration. These make it impossible to cost the technology with any accuracy. In general terms, however, it appears that the capital cost would be many times that of burner modifications for NO_x reduction — the latter would, in any case, be a prerequisite in order to minimise total costs. Recurrent costs would hinge critically upon catalyst life.

In view of the very high costs of catalytic denitrification and the need for it to be preceded by low NO_x burners for the most cost effective action, no extensive development is being undertaken on this technology, but contact is being maintained at technical level with manufacturers and users of the system to ensure the early identification of developments and research is being undertaken on the compatibility of the technique with UK flue gas conditions.

2.2 SO_x CONTROL

2.2.1 *Before Combustion*

(a) Coal Cleaning (see Item 2 of Table 1)

The potential of coal cleaning as a means of removing pyritic sulphur and thereby decreasing emissions is currently being studied. Some power station coals are already cleaned but indications so far are that extending washing to all power stations coal supplies using conventional technology would reduce power station SO_x emissions by about 5%. Economic assessments which are still in progress show that the first 2% might be removed at a cost comparable with Flue Gas Desulphurisation (FGD). The study is also investigating the scenario in which high sulphur streams are sent to plant fitted with sulphur capture equipment and low ash, low sulphur streams are sent to unconverted plant — the overall purpose being to maximise cost-effectiveness. These evaluations also incorporate estimates of benefit from burning lower ash fuels which arise as a consequence of the extended coal washing.

A plant trial is being considered to firm up on these estimates and confirm that there are no operational problems when burning very low ash fuel.

Developments in coal cleaning techniques will be incorporated in this ongoing study, for example, the use of high gradient magnetic separation of pyrites on p.f. milling plant (the highly comminuted state after the classifier favouring selective removal of inorganic sulphur), pneumatic separation and two stage froth floatation.

(b) Coal Water Mixtures (CWM) (see Item 3 of Table 1)

Mixtures of finely divided coal and water, primarily being developed as a substitute for oil, need to be low in ash. They are therefore likely to be made from coals which have undergone deep cleaning. This preparation route has the added potential of significantly lowering the sulphur content of the fuel. Samples of proprietory brands of coal water mixtures as well as some prepared from UK coals have been tested in laboratory combustors to determine their combustion and ashing characteristics. These tests have shown that the majority of UK coals can be considered as possible candidates for CWM. At present, there is no clear economic advantage in converting power stations to CWM, but assessments continue.

(c) Gasification (see Item 5 of Table 1)

Combined cycle plant using coal gasifiers with gas turbines may, in the future, have advantages over conventional plant fitted with flue gas desulphurisation. A study is investigating the technical and economic potential of using the BGC Lurgi Slagging Gasifier in various modes for power generation. Design contracts for a full scale commercial station based on combined cycle plant using the BGC Lurgi Slagging Gasifier have been placed with a plant manufacturer.

2.2.2 *During Combustion*

(a) Direct lime/limestone injection (DLI) (See Item 7 of Table 1)

In this process a sorbent (lime or limestone) is injected into the furnace. Studies made on pilot and full-scale plant show that for this process to be effective the boiler must have been modified to function in a low NO_x mode, ie, with staged combustion. Based on the present state of the art an outline engineering evaluation for a 4 x 500 MW plant using limestone concluded that a maximum of about 35% reduction in SO_2 could be achieved at a capital cost of £78M and operational costs of £12.1 m/a. Both capital and revenue costs are significantly higher per tonne of sulphur abated than with flue gas desulphurisation (lime injection is more expensive). The limestone injected increases the ash burden in the system by over 50% with a large and adverse change of ash chemistry — it has not been possible to assess the deleterious impact on boiler availability that such a significant change would have.

In view of the low potential of this process no experimental research is being undertaken. However, there is participation in specialist groups overviewing the DLI programme being undertaken by the International Flame Research Foundation. Contact is maintained with utilities in the Federal Republic of Germany and Austria who are investigating the process in conjunction with flue gas desulphurisation.

(b) Pressurised fluidised bed combustion (see Item 4 of Table 1)

This technology, coupled with a gas turbine in a combined cycle plant, is under consideration for future coal fired power stations. The lower operating temperature of such a combustion system compared with a conventional pulverised coal fired boiler offers reduced NO_x levels from the plant, and it also has potential to permit the extraction of sulphur in the fluidised bed by the addition of dolomite and possibly limestone. The largest pressurised fluidised bed combustion boiler in the world is the test and research facility at Grimethorpe in the United Kingdom. It was built under the auspices of the International Energy Agency (IEA) and was inaugurated in November 1980. The IEA completed its programme of work but the UK is to continue work on the Grimethorpe installation. A new 2½ year phase of work was started in August 1984 and may be extended if deemed necessary.

Preliminary studies showed generation efficiencies of around 40.5% to be feasible (compared to values of around 37.5% for conventional plant fitted with FGD) and overall costs that are lower than conventional plant fitted with FGD; subject, of course, to satisfactory development of PFB technology.

The new programme of work at Grimethorpe is concentrating on areas of particular concern such as the optimum configuration of tube bank for performance and durability; gas cleanliness for compatibility with gas turbine performance and reliability (recognising the potential for erosion or corrosion); an understanding of sulphur capture in the bed by sorbents and a means for the selection of the most favourable types; and the analysis of reject ash and unreacted sorbent from the bed and the identification of an environmentally safe disposal route.

In addition, and in parallel with the Grimethorpe work, an engineering design study is being undertaken (on similar lines to that outlined in Section 2.2.1(c) above for coal gasification) of a commercial scale combined cycle plant.

2.2.3 *After Combustion, Flue Gas Desulphurisation (FGD)*
(See Item 1 of Table 1)

Flue gas desulphurisation (FGD) is achieved by contacting flue gas with wet or dry alkali which absorbs the SO_2. A wide range of different processes have been developed. At present, only the wet processes have been operated adequately at a scale which makes direct translation to power station operation credible, although new dry processes are being introduced on the commercial market and will be evaluated as data becomes available.

Four wet processes were considered as being available commercially at the necessary scale; they are all capable of about 90% desulphurisation. However, one produces a slurry mixture of calcium sulphate and sulphite that would pose substantial disposal problems and render the system unsuitable for use in the UK. Attention was therefore directed to the other three, namely, Wellman-Lord, Limestone Gypsum and Sea Water Washing for coastal stations. A progressive series of studies are being undertaken with the object of providing cost and engineering data. The assessment of the Wellman-Lord system has been completed in co-operation with manufacturers and a similar assessment of the limestone gypsum process is well advanced. An environmental assessment of the effects of the effluents from sea water scrubbing is also proceeding.

Based on the design studies undertaken for the Wellman-Lord process, the capital cost of providing an FGD process at a new 2000 MW power station would vary between £60 million and £125 million depending on the system selected (the lower figure applying only to sea-water washing). The increase in the total electricity generation cost (revenue costs plus capital repayment), would be between £20 million and £30 million per annum; these figures allow for the cost of replacing lost output from the station due to the consumption of electricity by the FGD process.

In the case of existing plants, retro-fitting an FGD process would be more expensive; up to £160 million capital for a 2000 MW station. The increase in total generating cost would also be higher, at up to £35 million per annum. The cost of FGD per tonne of sulphur abated will vary between £440 per tonne and £740 per tonne, depending on the process adopted; the average being about £550 per tonne.

Technically, however, these processes are believed to be available in a satisfactorily engineered form should the need arise to use them. There is, nevertheless, a problem created by the high chlorine content of UK coals. In order to overcome this, a chloride prescrubber is being developed as a necessary precursor to being able to specify an FGD plant for UK conditions.

The spray dry process is presently being installed in the US on about 3500 MW of power plant which predominantly use low sulphur coals with highly alkaline ash content. The system is only proven on such coals though developments are taking place to prove the process on higher sulphur coals. However the economic advantages claimed for spray drying processes will be eroded as the sulphur levels in the coal rise. In the UK the relatively high chlorine levels in the UK coals will create problems and the disposal of the products (a mixture of fly ash, calcium hydroxide, sulphute, sulphate and chloride) could be extremely difficult and therefore expensive. Unless a very high removal efficiency can be achieved the cost of the lime absorbent will be prohibitive and will make this system unsuitable for use in the UK on all but low load factor plant and some industrial plants.

CONCLUSIONS FOR FGD SYSTEMS

The examination of possible processes has enabled some to be rejected for large scale UK applications. The following processes, however, merit further evaluation:

Commercial processes	(i) Wellman Lord (ii) Limestone Gypsum
Development processes	(i) Seawater scrubbing (ii) Spray drying

Two important aspects of FGD which have not been much examined are the effects on the environment caused by the disposal of waste products from the processes and the effect that the movement of large quantities of reagents and products to and from large power stations can have on other industries. These are problems which need very careful attention for each specific site.

Some idea of the scale of the import/export problem can be gauged from inspection of Table 2 which shows the approximate major import/exports from various FGD processes installed on a 2000 MW coal fired power station. From this Table and Table 3 which shows the products as a percentage of the existing UK market, it can be seen that any FGD process in the UK will have a considerable impact on the chemical and other industries. It is unlikely therefore that any one of the processes described above will prove to have universal application to stations in the UK.

2.3 DUST CONTROL

All modern coal-fired power stations in the UK employ electrostatic precipitators for the retention of dust. Performance standards for these precipitators are set for each plant but the standard varies depending on the date on which the design of the plant was agreed with the regulating authorities. For the most modern plant an emission standard of 115 mg^{-3} is required, to be achieved continuously (this calls for a collection efficiency of ca. 99.5%). The EEC proposed Directive would, if adopted, place a much more onerous obligation and, hence, sharply increase costs. In order to achieve consistent compliance with the UK standard and to reduce the cost of meeting putative EEC requirements, research is being undertaken on improving precipitator operation and design. Laboratory studies are proceeding on the basic mechanisms of: particle charging, movement and collection; rapping; pulsed energisation; influence of corona wind on flow and collection. Field tests of pulsed energisation and advanced control systems are under way and tests of SO_3 injection are planned.

A large hot precipitator test facility rig is nearing completion of its construction phase and commissioning has begun. The rig will enable various designs of precipitator and energizing systems to be tested in hot gas with controlled chemistry and dust content thus simulating much more closely plant conditions at an early stage before commitment to plant trials. It will be used to increase the basic understanding of the existing full scale trials and to screen new technology developments before undertaking full scale tests.

ACKNOWLEDGEMENT

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TABLE 1

ACTION PROGRAMME ON THE CONTROL OF EMISSIONS OF SO_2 AND NO_x

	Target Date
1. FLUE GAS DESULPHURISATION	
1.1 Engineering Assessment of Wellman Lord process — commercially available	Complete
1.2 Engineering Assessment of Limestone/Gypsum process — commercially available	1986
1.3 Pilot Installation of HCl Prescrubber for 1.1 or 1.2 — necessary for UK coals	1986
1.4 Comparative study of FGD and coal washing including "enriched" streams to FGD	1986

TABLE 1 (continued)

(FLUE GAS DESULPHURISATION, continued)	
1.5 Assessment of "once-through" sea-water washing process	Ongoing
1.6 Assessment of Lime Spray Dry Process	Ongoing
2. COAL PREPARATION FOR SULPHUR REDUCTION	
2.1 Joint study of potential	Complete
2.2 Rig trial of high gradient magnetic separation	1988
2.3 Evaluation of advanced techniques	1987
3. COAL WATER MIXTURES — as a low sulphur replacement for oil	
3.1 Assessment of potential for UK	Ongoing
3.2 Laboratory scale preparation	Ongoing
3.3 Laboratory scale preparation	Ongoing
3.4 Planning of station trial of commercial CWM (proposed)	1987
4. PFBC COMBINED CYCLES — as a high efficiency system for the 1990s with built in sulphur retention	
4.1 Tripartite outline design study with British contractors	1986
4.2 Practical development at Grimethorpe Phase A, 3 years	1986/87
5. GASIFICATION COMBINED CYCLES — as a potentially high efficiency system for 2000 and beyond with built-in sulphur retention	
5.1 Design study with British Gas Corporation (BGC), National Coal Board (NCB), Department of Energy (D.En.) and British contractors	1986
6. LOW NO_x BURNERS	
6.1 In-house research and assessment	Ongoing
6.2 Low NO_x burner development with British manufacturers	1987
6.3 Station trial of rich fireball low NO_x burners	1985/8
6.4 First station trial of front-fired low NO_x	1986/9
6.5 Second station trial of front-fired low NO_x burners (proposed)	1987/90
7. DIRECT INJECTION OF LIMESTONE	
7.1 Assessment of potential and costs with Her Majesty's Industrial Air Pollution Inspectorate (HMIAPI), Department of Energy (D.En.), Department of Environment (DoE)	Complete

TABLE 2
APPROXIMATE ANNUAL FGD IMPORT/EXPORTS TO A 2000 MW POWER STATION OPERATING ON A 2% SULPHUR COAL AT 90% REMOVAL EFFICIENCY & 70% LOAD FACTOR

MATERIAL	FORM	WELLMAN-LORD	LIMESTONE/ GYPSUM	LIME/ GYPSUM	LIME/ SPRAY-DRY	LIMESTONE INJECTION*
Imports						
Limestone	Solid	33,000	300,000	-	-	550,000
Lime	Solid	600	-	200,000	340,000	-
Caustic Soda	47% Liquor	32,000	-	-	-	-
Exports						
Sulphur	Solid	68,000	-	-	-	-
(Sulphuric acid)	(98% cone.)	(217,000)	-	-	-	-
Sodium Sulphate	Solid/Solution	27,000	-	-	-	-
Calcium Chloride	38% Liquor	78,000	78,000	78,000	-	-
Gypsum	Solid	-	520,000	520,000	-	-
Mixed product (recovered with fly-ash)	Solid	-	-	-	640,000	445,000

* assumes 35% SO_2 removal
All quantities are in tonnes/annum

TABLE 3 FGD PRODUCTS AS A PERCENTAGE OF EXISTING UK MARKETS

	Equipping one 2000 MW* station (2% S, 0.4% Cl)	Equipping all UK Coal Fired Stations (1.6% S, 0.25% Cl)
H_2SO_4	8%	100%
S	8%	100%
$CaCl_2$	3% (of total production)	50% (of total production)
HCl	14%	200%
Gypsum	11%	200%
Na_2SO_4	25%	400%

* 70% Load Factor

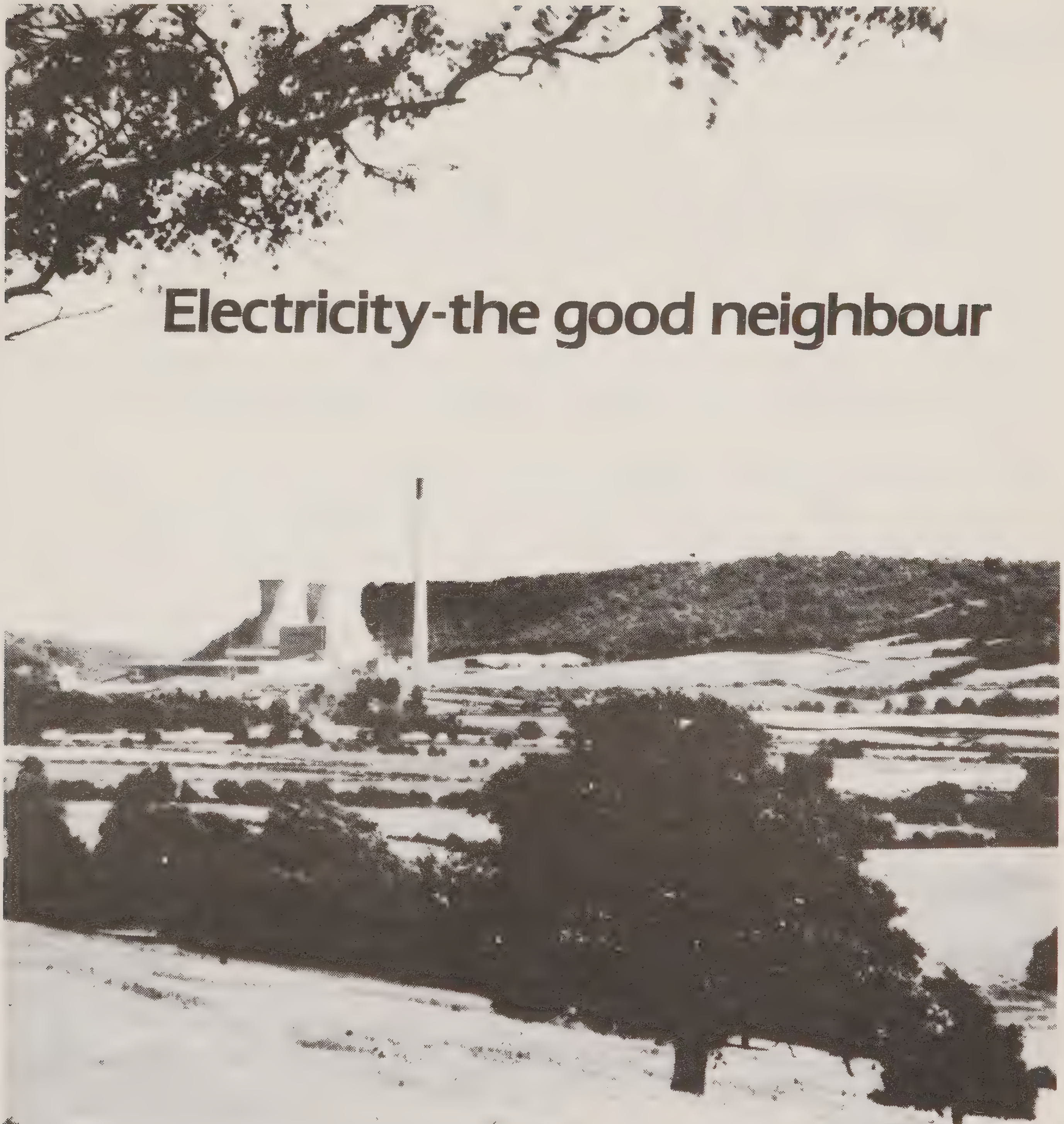
BOOK REVIEWS

SHORT REVIEWS OF BOOKS RECENTLY RECEIVED

Air Pollution and Plant Life by Michael Treshow, published by John Wiley and Sons (1984), price £37.50.

Diverse effects of air pollution on plant life have been noted this century and with studies proliferating throughout the 1970s there is now a large body of literature on the subject. "Air Pollution and Plant Life" is a carefully ordered collection of chapters by specialists from different countries. The scene is set in five chapters on air pollution, dispersion, long range transport and monitoring. Apart from a final chapter at the end of the book on controlling atmospheric pollution, the remaining twelve chapters concentrate on the impact of various pollutants, singly or in combination, upon plant life at all levels.

The editor has chosen to organise the material in this way so as to develop concepts on the way pollutants act on plants: hence the treatment of the major air pollutants first at the chemical level of action, leading on to the organismal and ecological consequences. The book is intended as a reference work for students in the air pollution field and many related disciplines and should be equally valuable to those responsible for control of air pollutants in central and local government and within industry.



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Sudbury House, 15 Newgate Street, London EC1A 7AU

Reader Enquiry Service No. 864

Atmospheric Chemistry and Physics of Air Pollution by John H. Seinfeld, published by John Wiley and Sons (1986) price £61.35.

This book, by an American author from the California Institute of Technology, is intended to provide a rigorous and comprehensive treatment of the chemistry of air pollutants in the atmosphere, including the formation, growth and dynamics of aerosols, the meteorology of air pollution, and the transport, diffusion and removal of species in the atmosphere. The book assumes a good basic knowledge on the part of the reader, and its treatment is aimed at near graduate level in chemical, mechanical, civil and environmental engineering disiplines.

Basically, it is intended as a course text book but will also serve as a comprehensive reference book for anyone professionally involved in air pollution control.

The book is divided into six main subject areas as follows:

> air pollutants, their sources and effects; air pollution chemistry; aerosols; air pollution meteorology; atmospheric diffusion; and special topics in the atmospheric chemistry and physics of air pollution.

The final chapter is devoted to "acid rain", which in a sense combines all the features of the previous chapters of the book and thus serves as an elegant summarising problem for the entire field of air pollution chemistry and physics.

Controlled Air Incineration by Frank L. Cross, Jr. and Howard E. Hesketh, published by Technomic Publishing Company Inc, USA (1985).

In the United States, incinerators have become an increasingly popular way of disposing of combustible and hazardous waste, particularly if the system is combined with waste heat recovery. This book explains the basis of controlled air incineration, which is one of the four principal types of incinerator used for the disposal of solid wastes. Controlled air incineration is more able to meet increasingly stringent air pollution control standards than the other types. Thus, its evolution is closely related to the growth of air pollution control standards and regulations.

The book describes the various types of incinerators and the principles of combustion and then reviews the operating requirements for incineration of a wide range of wastes. Emissions, controls, energy recovery and costs are then discussed although the UK reader will find that some of the second half of the book is very specific to the US situation. Useful for those exporting incinerators, though!

Another recent publication on incineration is *"Hazardous Air Emissions From Incineration"* by Kelvin R. Brunner, who is a chief engineer of incineration systems in Virginia, USA. Again, the focus is on the US regulations applicable to incineration but there is much useful material for those who are concerned with the constituents of incinerator emissions and their potential hazard. There is, for example, a useful chapter on dioxins and another on emission factors and means of estimating incinerator emissions. A range of control systems are discussed, as is noise generation and its control. The book, published (1985) by Chapman and Hall, is available in this country, price £37.50. The book is suitable for both technical and non-technical readers.

Fabric Filtration for Combustion Sources: Fundamentals and Basic Technology (Mechanical Engineering Series, volume 41), by R.P. Donovan, published by Marcel Dekker, Inc., US and Canada (1985), price S90.00.

In the United States fabric filtration has grown from an interesting phenomenon of isolated impact into a first-line control technology with annual sales running at about a quarter billion dollars. Technical and legislative developments have all contributed to the growth in this sector.

This volume documents the improved understanding and technology accompanying the growth in the market for fabric filters. It covers the entire range of fabric filtration activity, from a fundamental review of textile concepts, through to discussion of mathematical models and baghouse hardware. The book also highlights various laboratory and field experiences. Among subjects examined in depth are filtration models and baghouse fabric filtration. The book is aimed at a readership of suitable engineering disiplines as well as fabric filter users and manufacturers, and regulatory authorities.

Handbook of Emission Factors, Part I and Part II; Part I: Non Industrial Sources: Part II: Industrial Sources. Published under the auspices of the Ministry of Housing, Physical Planning and Environment of The Netherlands, by Staatsuit Geverij, PO Box 20014, 2500 EA 's – Gravenhage, The Netherlands.

An emission factor is defined for the purposes of this two-volume handbook as "a number that indicates how much air- or water-polluting matter is produced per emission-governing unit". As an example, during the manufacture of sulphuric acid, sulphur dioxide is emitted together with other products. The emission factor is expressed in kg SO_2/tonne of sulphuric acid. In that case the "tonne of sulphuric acid" is the emission-governing unit.

When the annual production of a particular industry is known, then the emission of polluting substance to the atmosphere or surface waters can be determined by multiplying the annual production figure by the emission factor. No measurements need necessarily be made, which represents a saving in both time and money. The system has been applied in the United Kingdom for many years and we have historically had a better record of estimated emissions from fuel use than most of our European neighbours.

However, emission factors should be used with care because appreciable differences can arise among comparable industries. These differences may be caused by factors such as the process applied, the life of equipment and its maintenance, and in particular by emission control measures such as the installation of dust collectors. But, provided that the emission factors given in these volumes are used properly, they can be valuable aids in pollution control decisions.

Part I gives the emission factors for domestic activities, space heating, traffic, agricultural activities and natural sources. Part II gives emission factors for a number of industrial processes and industrial activities of a relatively general nature. Manufacturing processes and the cause of emissions are briefly discussed.

Fundamentals of Air Pollution (Second Edition), edited by Arthur C. Stern, Richard W. Boubel, D. Bruce Turner, and Donald L. Fox, published by Academic Press Inc. (1984), price £28.00.

Any book which lists Arthur Stern amongst its authors or editors can be approached with confidence. This one, consisting of six parts and with four authors, shows his influence throughout the text. It is over ten years since the first edition of this book was published, but the fundamentals of air pollution control have not changed. The basic physics, chemistry and engineering are still the same but, to take account of the greater in-depth understanding of their application to air pollution, this edition includes 15 new chapters. The rest are revised and updated versions of those in the first edition. The new chapters include more detailed discussion of atmospheric chemistry, long range transport of pollutants, acidic deposition, mathematical modelling, and new methods of chemical and physical analysis as well as developments in control technology and regulatory concepts.

The whole makes an excellent study text for students, and a first-class source of reference for practitioners in any field related to air pollution control. As with any book compiled by American authors there will be some concepts and practices confined to that country and not directly applicable in the UK. But the tendency is for developments in air pollution control to spread across national boundaries. It may be a decade before US innovations are applied here, but it is highly probable that their influence will eventually be felt, particularly as EEC policies expand and begin to predominate here.

Indoor Air and Human Health by R.B. Gammage and S.V. Kaye, published by Lewis Publishers Inc. and available in the UK from John Wiley & Sons Ltd price £35.90 (1985)

The US literature on indoor air pollution is far more substantial than its British counterpart. This new volume is arranged in five parts to cover the broad subject areas of greatest concern: radon, microorganisms, passive cigarette smoke, combustion products, and organics. The concern about indoor air pollution and its effects on human health has been similarly focused in this country, and probably the most useful aspect of this book to the British reader is that it sets current UK research in the context of a large number of studies carried out in US and other parts of the world.

NSCA POLICY

INTRODUCTION OF LEAD-FREE PETROL IN THE UK

In November 1985 the DOE issued a discussion document on possible measures to introduce lead-free petrol into the UK, under EC Directive 85/210/EEC.

The Government hoped that unleaded petrol would be generally available by autumn 1989, but warned the transition period could last to the end of the 1990s, by which time leaded petrol at garage forecourts could be fully phased out through lack of demand. During the transition period, however, the owner of a car designed and tuned to run on unleaded (3 - 4 star) petrol could equally well use the higher octane 4 star 0.15 g/l leaded petrol — which is why measures must be taken to ensure as far as possible that leaded petrol is not used in vehicles designed to run on unleaded petrol.

The document posed 12 specific questions on ways and means, covering in particular the following areas:

— How should unleaded petrol be introduced to UK forecourts; which garages should stock it (given that a basic national network will be required from 1989/90) and, if necessary, what requirements should be placed on retailers to sell it?

— Unleaded petrol is more expensive to produce than leaded, as it needs more refining; retailers will incur additional costs since new tanks/pumps will be required at the forecourt. DOE estimates that unleaded petrol could cost, in total, between 1½ - 4 pence more than 4 star. Should price differences be adjusted, by differential taxation or otherwise, to persuade motorists to buy?

— What steps should be taken — technical or otherwise — to ensure that motorists do not use unsuitable petrol and are positively encouraged to use lead-free petrol in cars that can run on it? (Proposals included, in addition to labelling in forecourts and on the pumps: labelling in vehicles, an educational campaign, and different types of pump nozzles. Different (narrower) filler pipes for cars were not favoured by DOE since during the transition period drivers of some cars capable of using lead-free petrol might perforce have to use low-leaded for lack of an unleaded supply. In a few years' time, different filler pipes could be a standard fitting for new cars. DOE rejected the German tactic of tax reductions on cars designed to use unleaded fuels.)

NSCA VIEW

"The NSCA welcomes the consultation by the DOE on the Introduction of Unleaded Petrol, as evidence of its genuine wish to secure the wide availability of lead-free fuel. The Society is concerned that the Government appears to foresee a lengthy transitional period during which leaded petrol would continue to be sold. The NSCA believes that Government should encourage the maximum amount of lead-free petrol to be used as quickly as possible — with a national campaign to explain the benefits.

The Society has considered all the points raised in the discussion paper and has come to the following conclusions regarding ways and means to effect the speedy introduction and widespread use of lead-free petrol.

1. It will not be possible to depend on market forces for quick results: there must be positive discrimination in favour of lead-free petrol, backed by legislation. To speed the transition, lead-free petrol should be priced so as to encourage its use by cars capable of running on it, and the replacement of cars unable to use it. This would entail the sale of 95 RON unleaded petrol at a price significantly *below* that of 4 star leaded petrol, and at the same price as, or below, the price of 2 star leaded petrol.

2. While the demand for leaded petrol remains high many garages will be reluctant to give up a pump. The petrol companies should therefore be required, on an area and gallonage basis, to provide sufficient unleaded pumps to meet demand. These should be equipped with the smaller nozzle which, in turn, should become the limiting size of filler pipes for all cars designed to run lead-free.

   In the early stages, lead-free petrol supply should be secured in all significant centres of population and commercial activity (towns/cities) and at all motorway service stations. After 1989, lead-free petrol should be required by law to be available at all garages. Where rural garages wish to install a new tank/pump unit to supply lead-free petrol *before* 1989, Government should subsidise the installation. After 1989, substitution of 2 star leaded supply by unleaded should be effected. Given hardened valve seats, cars capable of running on 2 star petrol should be capable of running on lead-free petrol. To ensure that the motorist understands what fuel is suitable for his/her car, garages should be required to display charts based on information supplied by car manufacturers.

3. Unleaded pumps should carry a warning that the use of unleaded petrol could be damaging to vehicles specifically designed to run on leaded petrol. Unleaded petrol should be treated with a distinctive dye and pumps, tanks and vehicles should carry bold identification marks and labels.

4. With regard to cars, manufacturers have to take into account the European market in changing over to unleaded models. The European Community is in danger of becoming bogged down in problems that other nations, such as the US and Japan, have solved. The NSCA welcomes the Government's recent initiative to secure an early date by which all new models, and then all new cars, should be designed to run on lead-free petrol, and looks forward to a final EEC agreement in the near future. As company cars total approx. 80% of all new car sales in the UK, the tax advantages enjoyed by this sector should, from 1986, be permitted only for those capable of using lead-free petrol. This should significantly stimulate the market for lead-free cars and lead-free petrol.

5. As to broader emission controls, it is insufficient to rely on lean burn developments. In the medium-term cars with larger engines should be required under UK Construction and Use Regulations to be fitted with catalytic converters."

SMOKE CONTROL

CLEAN AIR ACT 1956
EXCHEQUER CONTRIBUTION TO SMOKE CONTROL ORDERS

The Department of the Environment has written to all local authorities who submitted programmes for 1986/87 notifying them of their allocations. The schedule of figures for individual authorities is as follows:

Exchequer Contributions on smoke control 1986/7

REGION AND LOCAL AUTHORITY	£
Northern	
Blyth Valley	25,713
Darlington	116,145
Gateshead	68,510
Langbaurgh	85,000
North Tyneside	56,000
South Tyneside	28,700
Stockton-on-Tees	9,000
Wansbeck	299,874
North West	
Blackburn	8,386
Bolton	101,294
Copeland	49,440
Liverpool	147,000
Oldham	31,714
Rochdale	32,000
Rossendale	18,000
St Helens	20,000
South Ribble	16,748
Yorks and Humberside	
Barnsley	181,497
Doncaster	399,784
Rotherham	242,736
Selby	73,914
York	24,000
Wakefield	112,000
East Midlands	
Ashfield	47,514
Bolsover	35,244
Bassetlaw	19,840
Broxtowe	14,560
North-East Derbyshire	10,300
Erewash	13,093
Gedling	11,461
Mansfield	60,184
Newark	15,935
Nottingham	19,760
South Kesteven	5,280
West Midlands	
Birmingham	31,660
Dudley	20,743
Lichfield	32,019
Newcastle-under-Lyme	21,428
Nuneaton	10,398
Staffs Moorlands	75,000
Walsall	85,715
Wolverhampton	49,920
Worcester	35,750
Eastern	
Peterborough	5,685
South West	
Bath	19,760
Bristol	31,515
Cheltenham	14,286
Northavon	8,571
South East	
Broxbourne	10,285
North Bedfordshire	10,349
Oxford	37,357
Slough	11,440

Exchequer Contributions on smoke control 1986/7 continued

REGION AND LOCAL AUTHORITY	£
GLC	
Southwark	17,000

There has been a further change to the criteria in para 10 of Circular 1/81. The figures given in Annex C to the Circular have been reconsidered in the light of the proposed programmes and from 1 April 1986 the following figures should be used in place of those given in Annex C:–

Yorkshire and Humberside	£400
Northern	£375
West Midlands	£325
East Midlands	£325
North West	£300
Elsewhere	£200

nsca

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Reader Enquiry Service No. 865

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Reader Enquiry Service No. 866

iuappa newsletter

THE INTERNATIONAL UNION OF AIR POLLUTION PREVENTION ASSOCIATIONS

The following items have been extracted from the February 1986 IUAPPA Newsletter. The full Newsletter is available on request.

US ACID RAIN COALITION

A new acid rain coalition was formed in the United States in December 1985, called "The Alliance for Acid Rain Control". The new group will be headed by Wisconsin Governor, Anthony Earl, with New Hampshire Governor, John Sununu, as Vice Chairman. With the aid of a research backup group, the Centre for Acid Rain and Clean Air Policy Analysis, the coalition hopes to provide ammunition to force through Federal acid rain legislation. Their first goal is a 15-25% sulphur dioxide reduction as a first phase programme. Having accomplished this, the coalition will re-examine the situation to see what more should be done.
(from *Washington Report,* published in JAPCA, Jan. 1986)

UK DEVELOPMENTS

House of Commons Follow-up Report on Acid Rain

In 1984 the House of Commons Environment Committee issued a report on acid rain which called for positive steps to be taken by the UK to reduce emissions of sulphur and nitrogen oxides, and pointed in particular to the damage affecting Britain's historic buildings. Although the report was criticised by both the UK government and the CEGB, it spurred a further investment into building damage research and added strength to the armoury of countries such as Sweden, Norway and various EEC Member States concerned about the UK stance on acid rain.

In January 1986 the House of Commons Environment Committee issued a follow-up special report, consisting principally of a verbatim transcript of a meeting between committee members and four government ministers — including Environment Minister William Waldegrave.

Mr. Waldegrave updated the Committee on research that was being carried out with government funding into effects of acid deposition on buildings, forests and fresh waters. Concerning future projections of emissions, and in particular whether the British "aim of policy" (a 30% reduction in SO_2 and NOx emissions by the end of the century) would be achieved, he said that the picture had been confused by the coal dispute of 1984/5.

A Department of Energy spokesman emphasised the uncertainties surrounding future trends of energy consumption and related emissions, but presented the Department's "best estimates" (as presented at the Sizewell Enquiry), which suggested that the total UK SO_2 emissions would be in the range of 3.5 to 4.2 million tonnes in 1990, and 3.1 to 4.1 million tonnes in the year 2000. On the same assumptions, nitrogen oxides emissions from all sources were estimated to be 1.7 to 2.1 million tonnes in 1990 and 1.6 to 2.2 million tonnes in the year 2000.

On the basis of these statistics, UK SO_2 emissions will by 1992 show no improvement at all, and up to a 20% increase. Thus, it is clear that the UK cannot join the "30% Club" unless the Government is prepared to authorise flue gas desulphurisation at two large power stations, at a cost of approximately £300 million. But Mr. Waldegrave was emphatic in rejecting positive measures such as flue gas desulphurisation in an attempt to bring the UK's emissions down further and faster than would be achieved by the factors on which the UK government is currently relying — an increase in nuclear powered electricity generation, energy conservation measures, and fluidised bed technology.

An independent assessment of the government's emission projections suggests that even the British government's aim of policy will not be achieved by the end of the century without changes in current energy and emission control policies. A paper by Dr. Jim Skea of Sussex University, entitled "Prospects for UK emissions of Acid Precursors" was presented at a meeting hosted by the Watt Committee on Energy in London, December 1985. Dr. Skea has calculated that SO_2 emissions would exceed the 3.27 million tonnes level required for the UK to achieve its stated 30% reduction policy aim by the year 2000. His figures further show that a 60% reduction, as proposed in the draft EEC large combustion plant directive, would, assuming no change in energy policy, require FGD to be fitted to 8-15 power stations by 1995. The UK government's desired 30% cut in 1980 base-date NOx emissions by the year 2000 also appears unrealistic. The UK's policy aim of a 30% reduction in total NOx is actually more stringent than the EEC large combustion plant target of a 40% reduction from large plant only, because of the large contribution that transport emissions make to total NOx in the UK. Although applying at a later date, the UK target is unlikely to be met without active abatement measures even allowing for reductions in motor vehicle emissions which will take place under EEC agreements.

EUROPEAN ASSOCIATION FOR THE SCIENCE OF AIR POLLUTION (EURASAP)

A new association of scientists concerned with air pollution has been formed. The aim is to provide a forum for co-ordination and communication between scientists throughout Eastern and Western Europe, on air pollution studies and their applications. The Association will organise specialised informal colloquia and workshops on selected topics for scientists with suitable expertise — bringing together about 50 individuals on each occasion. The Association also aims to encourage other activities which will lead to advancements in the science and control of air pollution. The Association is intended to benefit both research scientists and those implementing air pollution control measures, with emphasis on the exchange of ideas between scientists with different areas of interest and expertise.

Further details of the Association are available from its administrative office, at the following address: EURASAP, Environmental Safety Group, Mechanical Engineering Department, Imperial College, London SW7 2AZ, United Kingdom.

UPDATE

DISPOSAL OF WASTE OILS

The House of Lords Select Committee on the European Communities has been considering an EEC Proposal to restrict waste oil burning and promote its regeneration. The Committee took oral and written evidence from the Department of the Environment, the British Lubricants Federation, the Chemical Recovery Association and the Institution of Environmental Health Officers. They took further written evidence from about eight other bodies, most of which is published in the report, and referred to views submitted earlier by the NSCA.

The subject of the Committee's investigation is a Commission Proposal to amend the Directive 75/439/EEC on the disposal of waste oils. The purpose of that Directive was to reduce or eliminate pollution by waste oils, providing that as far as possible they were to be disposed of by re-cycling. Discharges into surface, ground or coastal waters and drainage systems were prohibited and firms disposing of the waste oil by combustion had to comply with the existing limits on discharges to air. The proposed amendment aims in particular at imposing stringent new limits on discharges to air from burning waste oil and tighter restrictions on the use of waste oils for combustion. The combustion of waste oil in furnaces smaller than 1 MW would be banned, unless compliance with strict emission limits was assured.

Just over 50% of the lubricating oil used in the United Kingdom (and the total is about 0.82 million tonnes) becomes waste oil; this is about 50% of the total waste oil, with spent motor oil making up the balance. The total amount of waste oil is thus about 430,000 tonnes. About half the waste oil is collected and treated, some undergoing a simple process of cleaning then to be sold as fuel, and a small proportion being carefully treated and sold for re-use as lubricants. About 120,000 tonnes of waste oil are burnt each year by the firms producing it, most in installations of 500,000 or more Btu's per hour. The concern has focused principally upon a relatively small percentage of combusted waste oil: the 40,000 tonnes of waste crankcase oil which are burnt annually in about 10,000 garages. This crankcase oil contains a small amount of the lead derived from petrol: up to 5% of lead in petrol in motor vehicles is transferred during use to the crankcase lubricating oil, according to figures supplied by Warren Spring Laboratory. Garages burn waste oil for space heating, but they may also sell oil that they can't burn themselves to waste oil collectors, who give them about 35 pence per gallon. About 20 or 30 collection firms are recognised by the Chemical Recovery Association and these can collect, store and re-distribute significant quantities of waste oil, but there are also hundreds of small operators or one-man businesses visiting garages and collecting the waste oil.

On the basis of the evidence presented to them, the House of Lords Committee has rejected the EEC proposal to restrict waste oil burning and promote its regeneration. They could find no evidence of environmental damage from waste oil burning in the United Kingdom and concluded that the proposed emission limits are too severe and would be impossible to enforce.

Having identified lead as the main pollutant released to the atmosphere when waste oil is burnt, the report found that it was not a major hazard and that the costs of implementing the proposal would far outweigh the limited environmental benefits.

The Committee were more concerned about the impact of the 100,000 tonnes of waste oil a year poured down drains or onto land or burned on bonfires by DIY motorists doing their own oil changes. The Committee say that there should be more publicity about the harm that these methods of disposal can cause, and they suggest that proper disposal facilities should help to solve the problem. Other measures recommended are storage and segregation of waste oils to prevent their contamination by other substances, and the introduction of a new British Standard for waste oil burners. The Committee believes that burning of waste oil has some advantages — for example, as a cheap form of heating. They saw no reason to stop that practice providing that properly designed and maintained burners are used. The Committee firmly rejected the idea that the oil regeneration industry should be boosted at the expense of those who wanted to use waste oil themselves as a form of heating.

The Committee's report *"Disposal of Waste Oils", House of Lords Select Committee on the European Communities, Session 1985-86 — 5th Report,* is available from HMSO price £6.30.

GOVERNMENT TO TIGHTEN WASTE DISPOSAL LAWS

The Government has completed consideration of the *Report of the Joint Review Committee on the Control of Pollution (Special Waste) Regulations.* It has also taken into account the views of the Royal Commission on Environmental Pollution in their 11th Report, published December 1985.

The Government has decided that improvements to the application of the law as it stands are not enough; the framework of control is to be changed to introduce stricter measures for the disposal of commercial and industrial waste.

The proposed changes to existing law would:

- put a general obligation on waste producers to take all reasonable steps to secure satisfactory disposal;
- extend the power of licensing authorities over operators of heavy goods vehicles;
- strengthen existing controls under the Control of Pollution Act;
- introduce a system for requiring waste handlers to register with local authorities; and
- enable waste disposal authorities to charge costs of control to licensed waste disposers.

Local authority associations and industry are being invited to join a small expert group which will advise on specific changes needed and keep the scope and application of the Regulations under regular review. Any changes proposed will also be the subject of wider consultation with environmental organisations.

CEGB ANSWERS ALLEGATIONS ABOUT ACID RAIN FILM

In June 1985 the CEGB premiered an information film on Acid Rain which was intended to underline the complexities and uncertainties which surround the subject. The film has had a mixed reception, with some knowledgeable viewers recognising that parts of the film's material and conclusions already appear dated, and with others feeling that the film would provide a very useful introduction to any discussion of acid rain in schools or by womens' groups.

The most serious criticism levelled at the film was that it was selective in its presentation of facts and choice of experts, in order to justify the view (held by the CEGB and the UK government) that the case for positive measures to reduce emissions from power stations has not yet been made.

These criticisms came to a head with a diplomatic protest from Norwegian Embassy Officials at a briefing in London in November. And in December 1985 the Director-General of the Norwegian Ministry of Environment condemned the film as "cynical" and claimed that it "conceals and twists facts about the problems of acid rain". The Norwegian authorities believe that the film shows a biased selection of examples, persons and points of view, with the result that UK sulphur emissions are shown apparently to make a neglible contribution to soil and water acidification in Scandinavia.

Answering these charges, the CEGB said in a press statement of 10 December 1985: "In a short film made for a general audience, it was not possible to cover every diverging viewpoint. The essential message of the film is that effective action can only be based on proper diagnoses. We believe that the recent swing in scientific views on the German forest problems fully justifies this position." The press statement also said that the film, ".... shows how misleading it is to describe all forms of atmospheric pollution as acid rain. It illustrates how German scientific opinion is moving towards ozone as the prime cause of forest damage. If this proves to be correct, controls on sulphur emission will not cure the problem."

With both sides having had their say, the matter might have rested there had it not been for an extraordinary intervention by the DOE, reported in the authoritative *ENDS* journal. To quote from the December issue,

"In an official statement on 13 December which reflects a long-standing disquiet with the CEGB's presentation of research findings on acid deposition, the DOE "regretted" that the film had been produced. The film, according to the DOE, contains "a selective account of scientific arguments. The interview with Professor Rosenqvist gives the appearance that he is representative of the mainstream of scientific report in Norway, which he is not." "

For all that, it is understood that the film is in heavy demand for showing to different audiences around the country. Those who wish to judge it for themselves may obtain a video recording of the 35 minute film from: The Public Affairs Manager, CEGB, Sudbury House, 15 Newgate Street, London EC1A 7AU, or from the CEGB's film distributors: Viscom Limited, Film and Video Library, Park Hall Road Trading Estate, London SE21 8DL, telephone: 01-761 3035.

GOVERNMENT TO SPEND MORE ON ACID RAIN RESEARCH

Environment Minister Kenneth Baker has announced an expansion in the Government-sponsored monitoring programme for acid rain.

During 1986, the Department of the Environment will fund work on a network of recently established acid rain monitoring stations, which will be expanded to cover ozone, nitrogen oxides and hydrocarbons. The DOE will also sponsor research teams from the University of Manchester's Institute of Science and Technology, the Institute of Terrestrial Ecology, Harwell, and the University of East Anglia who will carry out a major field study aimed at understanding the way in which sulphur dioxide from power stations and other sources is transformed in the atmosphere to acid rain. Other money will go on studies of the effects of air pollution and acid rain on UK lakes and streams, forests and crops, and buildings.

DOE's environmental protection research programme covers altogether more than 100 projects, among them studies of the environmental impact of toxic chemicals, and the disposal of both toxic and radioactive wastes. The whole programme is expected to cost about £19 million, 12% more than in 1985/86.

SWEDISH RESEARCH ON ACID RAIN

A useful bulletin published from time to time by the National Swedish Environmental Protection Board outlines current developments in acidification research in Sweden. The latest bulletin (Number 3, December 1985) discusses reports on: flora and acidification, the acidification sensitivity of Swedish forest soils, effects of sulphur compounds and other air pollutants on soil and water, and sensitivity of Swedish forest soils to acidification, amongst other studies. Each study is summarised on one or two pages, with useful details given in tables and graphs. *Acidification research in Sweden* is available from: National Swedish Environmental Protection Board, PO Box 1302, F-171 25 SOLNA, Sweden.

MARKING THE LEAD FREE PUMPS

Britain is the only EEC country which insists that petrol sold to the public must comply with a national standard. Our drivers have long depended on the BS 4040 "star" system displayed on pumps which identifies and guarantees the quality of the various octane grades being sold. This system will be retained for as long as leaded petrol continues to be on sale, but a new pump marking system for unleaded petrol has just been introduced as a basis for the new regulations which came into force on 1 January 1986. To avoid confusion, pumps dispensing unleaded petrol will be marked "unleaded" followed by "BS 7070" (the British Standard which applies to this new grade of UK petrol) and the grade designation "premium" or "regular".

CABINET RECORDS REVEAL MINISTERIAL OPPOSITION TO CLEAN AIR ACTS

Public records released at the beginning of 1986 under the "30 Year Rule" show that in 1955 the then Chancellor of the Exchequer, 'Rab' Butler, opposed some elements of the plans to introduce smoke control into UK cities. The records reveal that the Chancellor had accepted proposals for a subsidy to convert domestic fires to burn smokeless fuel, but vetoed a scheme to remove a 50% purchase tax on gas and electric heaters to encourage their sale. He also apposed tax allowances on the smoke-reducing equipment for industry, but accepted a Government loan scheme.

Clearly, the Government had by then acknowledged the overwhelming public opinion in favour of clean air measures, following the disastrous smog of 1952 and the pressure exerted by the National Smoke Abatement Society. The Chancellor appears to have been intending to limit the amount of public spending involved in measures designed to ensure that coal would be burnt cleanly.

NORTH SEA POLLUTION STUDY

The Environmental and Medical Sciences Division of Harwell Laboratory is to carry out a new study of air-borne pollution of the North Sea.

The study, which has been commissioned by the Department of the Environment, will focus on the deposition of heavy metals and persistent organic chemicals from the atmosphere into the North Sea. The investigation is part of DOE's contribution to an international European programme of co-operation on the prevention of marine pollution from land-based sources.

Deposition from the atmosphere is known to be a major contributor to the level of pollutants in some coastal waters. The Harwell study will provide detailed information on the concentration of pollutants over the North Sea and the rate of their deposition. Sampling of airborne particulates and deposited materials will be carried out for a year at 3 sites along the North Sea coast. All the samples will be analysed at Harwell for the concentration of 11 heavy metals, polychlorinated biphenyls, and a range of organochlorine pesticides. Harwell will also be reviewing (together with the Meteorological Office and the Institute of Hydrology) the available information on rainfall over the North Sea to improve estimates of overall pollutant deposition rates.

Ten years ago Harwell carried out a similar study of the North Sea for the Ministry of Agriculture, Fisheries and Food. The new DOE Study will therefore enable the assessment of any changes in the atmospheric burden and deposition rates.

CONCAWE ADVICE ON PREVENTING NOISE-INDUCED HEARING LOSS

A new report issued by CONCAWE, the oil companies' European organisation for environmental and health protection, describes the effect as well as the nature and role of hearing conservation programmes in preventing noise-induced hearing loss (NIHL).

The report emphasises that NIHL is insidious, gradually developing over a period of years. Often the effects are not evident until considerable and irreversible damage has occurred. This is recognised in Western European countries in which CONCAWE member companies operate, where legislation or guidelines have been introduced to limit workplace noise. The main part of the report describes, briefly but succinctly, the essential features of a comprehensive hearing conservation programme. For existing workplaces this would begin with an evaluation of the noise environment and would then be followed, where necessary, by measures to minimise noise emissions/exposure, by the hearing surveillance of those individuals most at risk, and by education of the workforce about noise-induced hearing loss and the need for hearing conservation programmes. For new processes a similar approach would be taken, but preceded by consideration of noise control at the design stage.

The need for competent personnel and adequate record keeping is stressed throughout and the report concludes by focusing attention on the responsibilities for implementation of a conservation programme.

Report number 7/85 entitled *"Workplace noise and hearing conservation"*, is available from: CONCAWE, Babylon Kantoren A, Koningin Julianaplein 30-9, 2595 AA Den Haag, The Netherlands.

ASBESTOS (PROHIBITIONS) REGULATIONS IN OPERATION

The *Asbestos (Prohibitions) Regulations 1985* came into operation 1 January 1986. These prohibit the most dangerous types of asbestos and the most hazardous processes using asbestos. Specifically, they ban the importation into the UK of raw crocidolite asbestos fibres and raw amosite asbestos fibres. The prohibition will also apply to the importation of crocidolite and amosite waste. Other prohibitions apply to the supply of crocidolite and amosite, products containing these minerals as articles or substances for use at work and their use, or use of any products containing them in the manufacture and repair of any other product. Asbestos spraying and the installation of new asbestos insulation is also banned.

The Department of Trade and Industry has prepared parallel legislation — the *Asbestos Products (Safety) Regulations 1985*, which prohibit the supply of products containing crocidolite and amosite intended for the domestic market. These Regulations also came into operation on 1 January 1986.

Although chrysotile (white) asbestos is not prohibited, work activities in which it is used are subject to stringent controls.

With these measures, the Health and Safety Commission's legislative programme of action on asbestos is nearing completion. The Commission expect to finalise their proposals for the control of asbestos at work during 1986.

The Health and Safety Executive recently issued a *Technical Note* setting out the latest advice and requirements for the selection of mobile dry floor sweeping machines for use with asbestos dust. Copies may be obtained from local HSE offices or from the Asbestos Manufacturing National Industry Group, c/o The Health and Safety Executive, West and North Yorkshire Area, 8 St. Paul's Street, Leeds LS1 2LW. Telephone: 0532 446101.

CODE OF PRACTICE FOR ENERGY EFFICIENCY IN BUILDINGS

A new British Standard Code of Practice for Energy Efficiency in Buildings — BS 8207 — together with an associated design guide, was launched at the end of January 1986 by Peter Walker, Secretary of State for Energy.

Speaking in London at the official launch of the publication, Mr. Walker said:

"I welcome the new British Standard Code of Practice and the design guide as an important contribution to Energy Efficiency Year. This initiative from the BSI, in conjunction with the Energy Efficiency Office, is all the more significant because of the enormous savings that energy efficient buildings can make over the years they are in service.

In some cases, buildings with a very poor energy efficient rating are using up to four times as much fuel as similar buildings using the same fuel. In money terms, raising the energy efficiency of commercial and industrial buildings alone could prevent the waste of £800 million a year."

SWISS FORESTRY DAMAGE PUTS ALPINE VILLAGES AT RISK

In Switzerland symptoms of damage to trees are showing in 36% of the forests that cover much of Switzerland. The trees most at risk appear to be those at high altitudes, and this presents serious problems for Swiss living high up in alpine villages where the trees have traditionally provided some protection from avalanches. The trees help to shield villages from landslides and rockfalls too, but it is snow slides (which can move at speeds of up to 250 km an hour) which are potentially the most dangerous. While the forests cannot actually stop an avalanche that starts higher up the mountainside, their branches can absorb considerable quantities of snow.

According to a report in *New Scientist* (2 January 1986) the Swiss Forestry Office has estimated that 10% of Alpine "barrier forests" will lose their protective capacity in the next few years, putting 150,000 people at risk and threatening the safety of hundreds of roads and ski trails. Forestry office scientists have blamed the damage on air pollution, including acid rain and fog and ozone.

SWEDISH FORESTRY GROUP URGES BRITAIN TO JOIN IN ACID RAIN CONTROLS

A Swedish Forestry Industry spokesman, Dr. Lennart Schotte, Chairman of a special committee set up by the Economic Commission of Europe, has urged Britain to do more to control "acid rain". He stated in London last November that widespread visible damage to forests in Europe, attributable to air pollution, made control action essential and that this should not depend upon sorting out final details about the precise combination of causes. He reported that a synthesis of latest surveys indicated that nearly seven million hectares of forest in Europe are affected by air pollution damage: equivalent to almost one third of the UK's land mass. Of this total, about 230,000 hectares (approx. 0.2% of the European forest area) are classified as dying or dead. The UNECE Timber Committee which put these figures together also noted that several countries in both Europe and North America have in addition found evidence of a decline in the rate of increment of stands.

Dr. Schotte pointed out that damage of

this nature posed a threat to the trade in forest products, and said that the fact that trees are often affected more than 20 years before damage becomes visible underlines the urgent need for action to control emissions.

Speaking of the work of the Swedish Forestry Industry to reduce emissions, Mr. Bo Wergens, Director-General of the Swedish Pulp and Paper Association, said that during the last 10 years, when Sweden was trying to cut emissions of sulphur by 50%, the Swedish Pulp and Paper Industry had succeeded in cutting its emissions from a total of 103,000 tonnes in the mid 1970s, to about 30,000 tonnes in 1985.

Estimated area of visible damage to crowns attributed to air pollution
(data available as of May 1985)

	Light damage	Moderate damage	Dying/ dead	Total	Percentage of exploitable closed forest area	
					Total damaged area	of which Dying/ dead
		(1000 ha)			(%)	
Austria	240*	80*	10*	330	10	0.3
Belgium	17*	2*	1*	20	3	0.2
Czechoslovakia	514*	123*	54*	691	16	1.2
France	86*	11*	3*	100*	1	-
Germany, Fed. Rep. of	2424	1163	111	3698	50	1.6
Hungary	103*	13*	4*	120	8	0.3
Luxembourg	25*	5*	- *	30	37	-
Netherlands	80*	20*	- *	100	34	-
Poland	419	199	36	654	8	0.4
Switzerland	295	76	13	384	34	1.6
Ten countries with known damage	4203	1692	232	6127	24	0.6
EUROPE (estimated)				6900	5	0.2

Note: Based on sources with varying methodologies. Data are not strictly comparable between countries. For some countries the figures shown are based on expert estimates or partial surveys.

* Unofficial figure or secretariat estimate.

(Source: UNECE, Timber Committee, 1985)

FUTURE EVENTS 1986

5 - 9 MAY — INTERNATIONAL CONFERENCE "Acidification and its Policy Implications"

Organisers: The Government of The Netherlands, in cooperation with the United Nations Economic Commission for Europe (UN ECE)

To be held in: Amsterdam

This event will review the state-of-the-art of acidification research covering the various geographical areas within the ECE region. Invited speakers will cover the following main topic areas: Effects in the Environment; Forest Dieback: the Potential Stress Factors; Effects on Materials and Cultural Property; Models as Tools for Abatement Strategies; National Research Programmes and Policies Regarding Acidification.

This International Conference stems from the June 1984 Munich meeting, when about 30 countries met to review the serious deterioration of the natural environment in Europe and North America. It was agreed then to review regularly the state of scientific knowledge in this field and its policy implications. The Government of The Netherlands offered to host the first meeting, an initiative warmly welcomed by the UN ECE.

Registration and Information Centre: National Institute of Public Health and Environmental Hygiene (RIVM), Mrs. O. van Steenis, P.O. Box 1, 3720 BA BILTHOVEN, The Netherlands. *Telephone:* (0) 30-742970; *Telex:* 47215 rivm nl.

12 - 24 MAY and 14 - 16 MAY — SHORT COURSES (Introductory and Advanced) on "Industrial Waste-Water Pollution Control"

Organisers: University of Sheffield — Centre for Continuing Vocational Education

These courses will benefit industrial scientists, engineers, technical managers and other staff of organisations concerned with the control of industrial waste-water discharges, looking at the main sources, characteristics, polluting effects, relevant legislation, analysis and treatment of waste-water. One or both of the courses can be attended over the five-day period.

Further details: Miss F.J. Wells, Centre for Continuing Vocational Education, University of Sheffield, Sheffield S10 2TN Tel: (0742) 78555 ext 4931

20 - 22 MAY — CONFERENCE "The VIth International Environment and Safety Conference"

Organisers: International Environment and Safety (Labmate Ltd)

The VIth International Environment and Safety Conference will be held in conjunction with the RoSPA International Safety Exhibition, and will cover health, safety and environmental subjects. Among the speakers will be: R.J. Perriman, Chief Inspector, IAPI — on New Approaches to Air Pollution Control; J. Langston, NSCA — on Current Controversies and NSCA Policies; James Tye, British Safety Council — on Communicating Health and Safety upwards to the Board; Jean Prentice, McCrone Research — on Air Sampling or Monitoring during Asbestos Removal; and Adam Markham of Friends of the Earth — on Acid Rain and Vehicle Emissions.

VIth International Environment and Safety Conference:

For full details and registration, contact: Diane Parker, IES Labmate Ltd., 'Newgate', Sandpit Lane, St. Albans, Herts AL4 0BS. Tel: (0727) 51993/31337 or Telex: 299957 Mediko

22 - 27 JUNE – "79th Annual Meeting and Exhibition of the Air Pollution Control Association

Organisers: The Air Pollution Control Association (APCA) of USA/Canada
To be held in: Minneapolis, USA
Topics: Air toxics, Acid rain, Indoor air quality, Risk Assessment, Hazardous waste management, Controls and operation technology, Environmental measuring and modelling; Special environmental issues.
Details and Registration: APCA, PO Box 2861, Pittsburgh, PA 15230, USA

24 - 26 JUNE – SHORT COURSE "Control of Substances Hazardous to Health at Work"

Organisers: University of Sheffield – Centre for Continuing Vocational Education
This course covers principles and current practices in the control of substances hazardous to health, with emphasis on assessment of health risks, monitoring and engineering control of hazards and health monitoring of workers. It will be of special interest to industrial scientists, engineers and technical managers wishing to prepare for the implementation of the proposed HSE regulations on the Control of Substances Hazardous to Health (COSHH).
Further details: Miss F.J. Wells, Centre for Continuing Vocational Education, University of Sheffield, Sheffield S10 2TN Tel: (0742) 78555 ext 4931

30 JUNE - 26 SEPTEMBER – 3 MONTHS INTENSIVE TRAINING COURSE ON "Environmental Impact Assessment"

Organisers: Centre for Environmental Management and Planning, University of Aberdeen
The course will provide participants with an understanding of the main principles, procedures and methods of EIA. Considerable emphasis will be placed on practical exercises which will include individual assignments and group studies. A certificate will be awarded to students who satisfactorily complete the course.
Course Fee: £2,700 + VAT (current rate, 15%)
Details: Sandra Ralston/Pearl Allan, Centre for Environmental Management and Planning, Department of Geography, University of Aberdeen, Old Aberdeen AB9 2UF, Scotland, UK *Telephone:* (0224) 40241 Ext. 5188/6515 *Telex:* 73458 UNIABN G

6 - 19 JULY – INTERNATIONAL SEMINAR "7th International Seminar on Environmental Impact Assessment"

Organisers: Centre for Environmental Management and Planning, University of Aberdeen
The seminar is sponsored by WHO and UNEP, with the support of the United Nations Development Programme.
Details: as above

16 - 18 SEPTEMBER – SYMPOSIUM "Gas Cleaning at High Temperatures"

Full details of the technical programme are now available from the organisers: The Conference Section, The Institution of Chemical Engineers, 165-171 Railway Terrace, Rugby, Warwickshire CV21 3HQ. Tel: (0788) 78214. Telex: 311780.

23 - 25 SEPTEMBER "The 1986 Environmental Health Congress and Exhibition"

Organisers: IEHO and (for the exhibition) Brintex Ltd.

Details of the exhibition are available from: Brintex Ltd., 178-202 Great Portland Street, London W1N 6NH. *Telephone:* 01-637 2400. *Telex:* 262568 Munbex G

26 SEPTEMBER – ONE-DAY MEETING "Acid Rain and Britain's Natural Ecosystems"

Organisers: Imperial College Centre for Environmental Technology

Details: Mrs. D.S. Paterson-Fox, Imperial College Centre for Environmental Technology, 48 Prince's Gardens, London SW7 2PE

7 - 10 OCTOBER – INTERNATIONAL CONGRESS "14th International Congress of the International Association Against Noise (AICB)"

Organisers: AICB

To be held in: Basle, Switzerland at the European World Trade and Convention Centre of the Swiss Industries Fair

The theme of the Congress is "Traffic Noise and Urban Planning". Main paper themes are as follows:

- Latest results regarding the abatement of the noise of aviation, railway and road traffic
- Actual situation in the research of the noise effect
- Planifications of cities, regions and urban planning
- Practical actions regarding the stabilization of traffic
- Technics and unification of noise measurement
- Considerations on the proportion cost/utility
- Legislative and administrative actions
- Influence of the traffic noise on the population movements

During the Congress, an extensive EXHIBITION on ENVIRONMENTAL PROTECTION AND NOISE ABATEMENT will take place in the halls of the Swiss Industries Fair within the scope of PRO-AQUA–PRO VITA '86

Further details of Noise Congress: Dr. Willy Aecherli, General Secretary, AICB, Hirschenplatz 7, CH-6004, Luzern

Further details of Exhibition: Swiss Industries Fair, Congress Department, P.O. Box, CH-4021 Basel, Switzerland. *Telephone:* 061/26-20-20, ext. 372. *Telex:* 64953 ewtcc ch.

19 - 24 OCTOBER – SHORT COURSE "Oil Pollution Control Course"

Organisers: The Institute of Petroleum

To be held at: Felixstowe, Suffolk

This residential course will provide both practical and theoretical training in oil spill control technology, with presentation of techniques evolved and tested by Warren Spring Laboratory

Details: Caroline Little, The Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR. *Telephone:* 01-636 1004

IN PARLIAMENT

14 JANUARY 1986 *Written Answers*

Pollutants (Synergistic Relationship)

Mr. Wilson asked the Secretary of State for the Environment what information he has as to the existence of a synergistic relationship between the two pollutant effects, sulphur dioxide and oxides of nitrogen.

Mrs. Rumbold: Research so far indicates that these two pollutants can be synergistic in their effects in some cases but that in others their combined effects may be equal to, or less than, the effect of each independently. Further research in my Department's programme is aimed at increasing our understanding of these complex relationships.

Acid Deposition

Mr. Wilson asked the Secretary of State for the Environment what freshwater bodies in the United Kingdom have become unable to support fish stocks because of acidification as a result of anthropogenic emissions of sulphur compounds; and, in each case, if a return to former viability is expected to be achieved by the end of the century, with or without liming operations.

Mrs. Rumbold: There are a number of man made and natural causes of acidification. The freshwaters where fish stocks have been most affected by acidification are mainly areas of high rainfall and acid geology in the north and west of Britain. A report by my Department's acid waters review group identifying the most susceptible areas will soon be published.

Acid Deposition

Mr. Wilson asked the Secretary of State for Scotland (1) if he will give figures to show the current levels of deposited acidity in grams of hydrogen ion per square metre per year, deposited non-marine sulphate, and deposited nitrate in grams of sulphur and nitrogen per square metre per year for *(a)* the Loch Ard area and *(b)* the Merrick in Galloway; and what is the number of years over which the figures are averaged;

(2) if he will publish estimates of levels of deposited acidity in grams of hydrogen ion per square metre per year and deposited non-marine sulphate and deposited nitrate in grams of sulphur and nitrogen per square metre per year for *(a)* the Loch Ard area, central Scotland and *(b)* the Merrick in Galloway for the years 1990, 1993, 1996, 1999 and 2001, respectively.

Mr. Ancram: Figures of the levels of deposited acidity in the Loch Ard area and the Merrick are not available but values can be deduced from the date published by the Department of the Environment review group on acid rain in 1983 and available from Her Majesty Stationery Office. Ranges representative of these general areas, averaged over three years 1978-1980, within which depositions may be expected to lie are set out in the table, over page.

	Wet Deposition		*Dry Deposition*	
	Loch Ard	*Merrick*	*Loch Ard*	*Merrick*
Hydrogen ion ($gH^{-}m^{-2}$ $year^{-1}$)	0.05–0.1	0.05–0.1	–	–
Sulphate (gSm^{-2} $year^{-1}$)	1.2–1.6	$>$1.6	0.5–1.0	0.5–1.0
Nitrate (gNm^{-2} $year^{-1}$)	0.2–0.4	0.1–0.2	Not Available	

It is not possible to make an accurate estimate of future deposition levels at specific sites in individual years because of the difficulty of forecasting emissions and the large year-to-year variation introduced by meteorological factors. Data from a number of Scottish sites suggest, however, that if present emission patterns remain relatively constant there is unlikely to be a significant change in deposition levels over the Loch Ard and Merrick areas in the next 15 years. A reduction in emissions would, however, be expected to result in generally reduced depositions.

Mr. Wilson asked the Secretary of State for Scotland what information he has to the maximum level of sulphur deposition, expressed in kilograms per hectare per year, which lochs and freshwaters in acid-sensitive areas of Scotland can tolerate without experiencing long-term acidification; and what information he has as to which specific bodies of water have already been acidified beyond this maximum level.

Mr. Ancram: The sensitivity of lochs and freshwaters to acidity varies according to geological and other conditions, and the level of sulphur deposition above which ecosystems may become affected is subject to continuing research The biological effects of long-term acidification have, however, been evident so far only in the surface waters of the Galloway and Trossach areas.

Mr. Wilson asked the Secretary of State for Scotland what percentage change there has been in the concentration of acidity of rainfall in Scotland between 1979 and 1984.

Mr. Ancram: Current research indicates that between 1979 and 1984 the concentration of acidity in rainfall in Scotland has reduced substantially, probably by 40 to 50 per cent., although the trend has not been consistent over the country due to effects of variable weather patterns. These figures are based on measurements taken since 1978 at a number of different sites throughout the country.

16 JANUARY 1986 *Written Answers*

Petrol (Lead Content)

Mr. Woodcock asked the Secretary of State for Energy what additional capital investment has been incurred by the United Kingdom oil industry as a result of the reduction in the maximum lead content of petrol from 0.4 to 0.15 g per litre from January.

Mr. Buchanan-Smith: The United Kingdom oil industry's most recently published figure indicates capital expenditure of the order of £300 million.

Mr. Woodcock asked the Secretary of State for Energy if he will estimate the extra energy, in terms of barrels of crude oil, that will be consumed at the refinery each year as a result of the reduction in the maximum lead content of petrol from 0.4 to 0.15 g per litre from 1 January and, subsequently from 0.15g per litre to unleaded, when the transition to unleaded petrol is complete.

Mr. Buchanan-Smith: For a petrol demand of 20.2 million tonnes, the additional crude oil required per year, when lead levels are reduced, is estimated to be:

From 0.40 to 0.15 g per litre (g/l) of lead — some 3.7 million barrels.

From 0.15 g/l of lead to unleaded — some 4.9 million barrels.

Mr. Woodcock asked the Secretary of State for Energy if he will estimate the increase in price that the United Kingdom oil industry will need to charge for each gallon of petrol as a result of the reduction in the maximum lead content of petrol from 0.4 to 0.15 g per litre and, subsequently from 0.15 g per litre to unleaded, when the transition to to unleaded petrol is complete.

Mr. Buchanan-Smith: The manufacturing costs incurred in reducing the lead content from 0.40 to 0.15 g per litre are believed to be about 2p to 3p per gallon. For the subsequent move to unleaded petrol, the costs are estimated to be in the order of a further 2p to 5p per gallon.

However, the extent to which pump prices may be increased is purely a matter for individual petrol retailers.

22 JANUARY 1986 *Written Answers*

Sulphur and Nitrogen Oxide Emissions

Mr. Alton asked the Secretary of State for the Environment whether the United Kingdom will now join those nations which have agreed a time scale to reduce sulphur and nitrogen oxide emissions by 30 per cent.

Mr. Waldegrave: No. The Government aim to reduce sulphur dioxide emissions by 30 per cent, on the 1980 base by the late 1990s and believe it would be wrong to commit the United Kingdom to potentially high levels of investment by joining those countries committed to achieving this reduction by 1993. It also aims to reduce nitrogen oxide emissions by 30 per cent, on the same basis and to the same time scale although there is no international agreement to reduce these emissions.

(All 'In Parliament' items were first published in *Hansard*)

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INDUSTRIAL NEWS

Pollution Abatement Division formed at Warren Spring Laboratory

WSL has recognised the growing importance of air pollution control technology by forming a new Pollution Abatement Division in Stevenage. The new division takes over part of the work of the Air Pollution Division and the dust related work of the Materials Handling Division. The work is concerned with the emission of particulate and gaseous pollutants to the atmosphere and to the workplace.

Its overall aims are:

— to provide policy makers and regulatory authorities with data on emissions, methods of measurement and abatement technology;

— to assist the process industry, and others, in the provision of cost-effective abatement and dispersion;

— to assist manufacturers and suppliers of abatement, measurement and control equipment.

A staff of 26 will work on a wide range of projects involving site testing, laboratory work, instrument development, desk studies and consultancy for a wide range of clients. The division has at its disposal a comprehensive set of facilities including: continuous gas analysis, particulate sampling, deposit gauges, dustiness testers, combustion rig, wind tunnels, mobile laboratories and pilot scale test equipment.

The new division will work closely with the Air Pollution Division which is principally concerned with ambient air quality monitoring, data analysis and interpretation, acid deposition, emissions from motor vehicles and the prediction of air quality by numerical modelling.

Companies wanting further information about the Pollution Abatement Division should contact: Dr. Clive Schofield,
Head, Pollution Abatement Division
Warren Spring Laboratory, Gunnels Wood Road, Stevenage, Herts SG1 2BX.
Telephone: 0438 313388.

Tough New Breed of Infra-Red Gas Analysers

A range of infra-red gas analysers has been introduced by Draeger Safety, Blyth, Northumberland, for applications requiring a tough, portable, battery-powered gas analyser for the measurement of carbon monoxide, carbon dioxide, methane and other hydrocarbons.

Called the Infralarm, the system is fitted with an audible alarm that is internally adjustable across the range of the instrument, and has an internal mute switch.

With optional probes and filters, the Infralarm provides a low-cost analyser for use in furnace atmospheres, stacks and vehicle engine exhaust measurements. Without the probes, applications exist in agriculture, controlled atmosphere chambers, power generation and the nuclear industry as well as other application areas.

Infralarm is powered by a rechargeable battery and, with continuous operation of analyser and pump, usable time between charges is in excess of eight hours. The analyser may also be used continuously with the charger connected to the mains.
Reader Enquiry Service No. **867**

Environmental Surveillance Network

Environmental Monitoring and Services Incorporated (EMSI), a wholly owned subsidiary of Combustion Engineering, Inc., (C-E) and part of its engineering and construction group, has been awarded a contract from Martin Marietta Energy Systems to design a computer-based environmental surveillance network at the Oak Ridge National Laboratory (ORNL) in Tennessee. Martin Marietta represents the U.S. Department of Energy as prime contractor for the operation of ORNL.

Under the contract, EMSI will design a network consisting of air, water and radiation monitors deployed both on and off site at the ORNL complex. A central data acquisition system will provide for near real time data telemetry, report generation, and alarm capability.

Two other C-E units, Lummus Crest Inc. and C-E Power Systems, are assisting EMSI with the project. Lummus Crest, C-E's engineering and construction group, is providing engineering design and installation services. Power Systems is designing and delivering the radiation monitoring package and the associated data loggers at the remote sites.
Reader Enquiry Service No. **868**

Nederman Lays the Dust

A new dust filtration device which promises to solve air pollution problems in many industries, is being launched by Nederman Ltd., experts in the technology of smoke and fume extraction.

The company has applied 30 years of practical experience to solving the problems of air-borne dust, which hampers many industrial processes and often poses grave health hazards. Industries likely to benefit from its neat, easily-mounted Filterbox include food, lime, cement, paint, insulation material, foundry and textile industries.

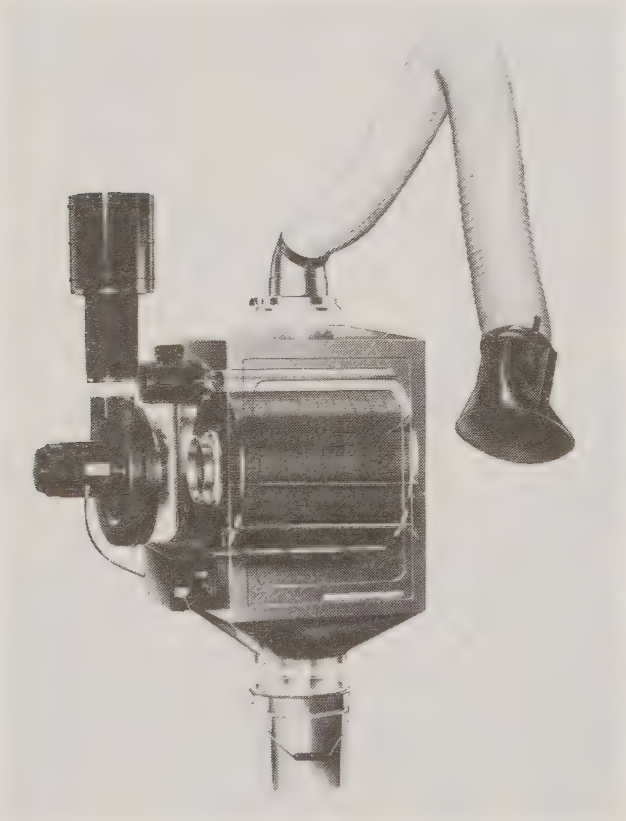
The Filterbox checks the dust at source, where it is most concentrated. Dust-laden air is drawn into a special filter where a pleated-paper cartridge collects particles. Clean air is returned to the atmosphere.

An ingenious, patented design overcomes one of the common problems associated with air-cleaning devices — the clogged filter. When the Nederman filter is full of dust, a cleaning motor is switched on and the suction fan stops automatically.

Folds in the filter are forced over cleaning loops which shake out the dust. The

Folds in the filter are forced over cleaning loops which shake out the dust. The dust is collected in a container at the base of the Filterbox. When the cleaning operation is completed, the filter drum stops and the fan re-starts automatically.

Normally, one minute is sufficient for the cleaning operation, although the period can be adjusted to suit the type of dust. The Filterbox is suitable for dry-dust particles, such as metal oxides, talcum powder, grinding of pharmaceutical dust and many others.



Precise regulation of the cleaning operation may be achieved by fitting a programmable control unit to automatically initiate cleaning at predetermined intervals. The filter gives a high degree of separation and can cope with 1000-2000 m^3/h of air, depending on the type of dust.

The Filterbox itself — 107 cm high, 80 cm wide and 61 cm deep — can be hung on a wall or connected directly to the source of dust. A suction arm can be fitted if required.
Reader Enquiry Service No. **869**

Pollution Monitoring Literature

A comprehensive guide on how ERWIN SICK OPTIC ELECTRONIC can assist British industry in complying with emission legislation is provided by the Hertfordshire-based company's latest publication.

As well as giving full technical specification on the emission monitors and ancillary equipment in the range, the full colour eight page leaflet provides graphic representations of the opto-electronic processes involved in emission control.

Carrying the reference 8 005 025.1085, the guide is now available from ERWIN SICK's UK headquarters, 39 Hedley Road, St. Albans, Herts. AL1 5BN.
Reader Enquiry Service No.

Asbestos Removal Video

Some of the uncertainties relating to the safe removal of asbestos-based insulation products from factories, schools, offices, hospitals and other public buildings are clarified in a new video produced by Torchcross Environmental Ltd., the largest UK manufacturers of airmovers and pressure monitoring equipment.

Under the title "Creating and Maintaining a Safe Work Enclosure" the sequences cover three vital aspects: Tent and airlock materials and construction; Airmover selection and specification; Negative pressure measurement and control. All three aspects are discussed with a view to meeting the latest Code of Practice issued by the HSE. Some common inadvertent malpractices are also highlighted in the form of computer graphics.

The video will be of interest to contractors who are directly or indirectly involved in this hazardous work, safety/health/environmental authorities, factory inspectors, training organisations and insurance companies.

Copies are available priced £29.00 plus VAT, refundable against equipment purchased. Free loan copies are offered to HSE officers, local authorities and training organisations.
Reader Enquiry Service No. **8610**

Cleaning tall chimneys

High chimneys such as those associated with steelworks, refractory manufacturing plants, boiler houses, kilns and incinerators can be easily, conveniently and cost-effectively cleaned by using high pressure water jetting. Using special nozzle carriers and in some cases specially designed drain cleaning jets and hoses, SLD Pressure Jetting Limited has thoroughly removed hardened soot and other crustaceous deposits from the insides of chimneys up to 200 feet in height — without anyone needing to step off the ground. The technique is particularly useful where there is no built-on ladder access to the top of the chimney, since it obviates the need for the skilled services of a steeplejack. SLD can set up its equipment, thoroughly clean the chimney and be gone again inside a few hours, with the minimum of fuss and little or no residual mess.

Depending upon the type of deposits to be removed, a chimney of say 200 ft high could be cleaned during an eight hour shift. Steel chimneys having exterior spiral fin stabilisers for windy conditions often preclude the use of ladders and are ideal candidates for pressure jet cleaning.
Reader Enquiry Service No. **8611**

ADVICE ON MUNICIPAL WASTE MANAGEMENT PLANNING

The Harwell Research Laboratory and consulting engineers, Binnie and Partners, have joined to provide a new international service on municipal waste management planning. At the core of this new service is the HARBINGER computer model for cost-effective waste disposal planning which has been developed to help waste disposal agencies to prepare and evaluate their long term plans. Using readily obtainable data, the model enables waste managers to forecast waste arisings, likely costs of different disposal options, and to assess the optimum arrangements for transport, treatment and disposal. The model can be modified by the waste manager and has been designed for use by city, regional or even state authorities. It is already being used by the Government of Hong Kong who are preparing waste management plans for a population of 5 million people.

Mainframe and micro-computer versions of HARBINGER have been developed. Harwell will install the model, and Binnie's and Harwell offer a joint service of support to their clients in preparing and using the necessary data.

For further ifnormation, contact: Dr. Philip Rushbrook, Environmental Safety Group, Building 146.3, Harwell Laboratory, Didcot, Oxon OX11 0RA. Telephone (0235) 24141 Ext. 2095.

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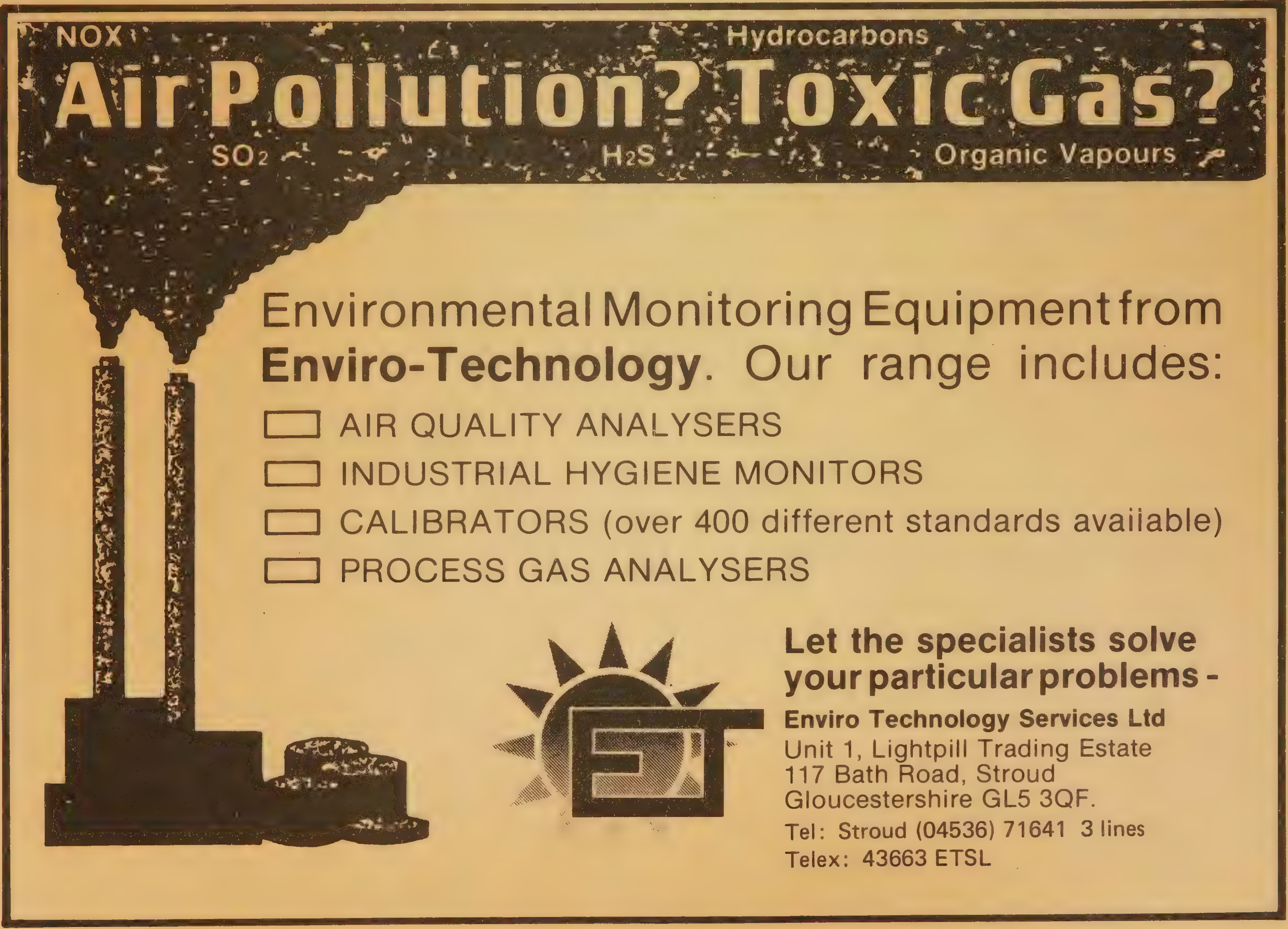

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Air Pollution? Toxic Gas?

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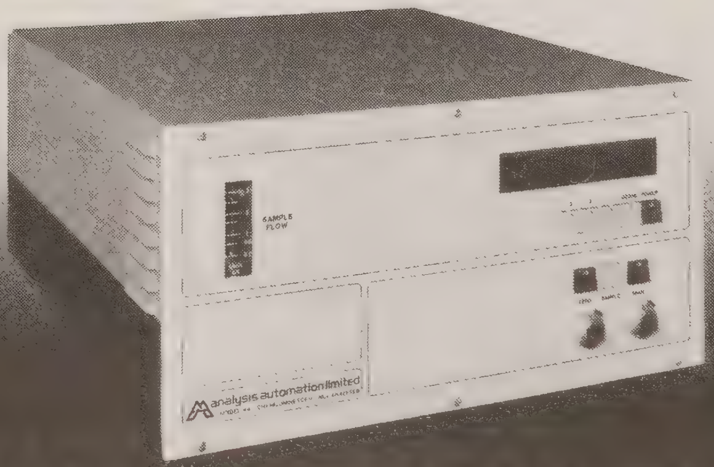
CLEAN AIR

1986

VOL.16 NO.2

Monitors that measure up.



Analysis Automation have introduced a complete new range of analysers for the measurement of ambient air pollutants.

The instruments are the first of their kind to be manufactured in the United Kingdom.

Together, they meet the total current requirement for state-of-the-art monitoring for ambient levels of SO_2, NO/NO_2, CO and Ozone.

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CLEAN AIR

THE JOURNAL OF THE NATIONAL SOCIETY FOR CLEAN AIR

Vol. 16, No. 2 ISSN 0300-5743 1986

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CLEAN AIR is printed and published quarterly (1986) by the National Society for Clean Air at 136 North Street, Brighton BN1 1RG. Tel: Brighton (0273) 26313.
Publishing Director: Air Commodore J. Langston, CBE, FBIM, Secretary General.
Editor: Jane Dunmore.
Advertising: Peter Mitchell.
Issued gratis to Members and Representatives of Members.
1986 subscription rate for CLEAN AIR — £11.95 post free. Advertising Rates available on application.

CLEAN AIR is the official journal of the Society, but the views expressed in contributed articles are not necessarily endorsed by the Society. Abstraction and quotation of matter are permitted, except where stated, provided that due acknowledgements, including the name and address of the Society are made.

Technical articles of full page length, or over, in CLEAN AIR are indexed in Current Technology Index. Abstracts are included in Environmental Periodicals Bibliography (EPB).

LOOKING AHEAD

Tight control on local government expenditure may be Mrs. Thatcher's priority task for the new Environment Secretary, but there is other work to be done more particularly related to the Environment. While Nicholas Ridley lacks a "Green" reputation, he is hailed as a spearhead of efficient management in government, and he is now well placed to oversee a positive drive for improved standards in environmental control.

In some respects we are living in the Stone Age in terms of enforcement of pollution control and as international obligations begin to bite we must move on. It is time to apply to air pollution control the benefits of information technology. EEC measures will require us to pay increasing attention to compliance reportage mechanisms. If we stick with the present system of infrequent visits by a slenderly staffed inspectorate who subsequently write up their reports, both industry and the enforcers will be snowed under with paper and overwhelmed by the task. We need to plan ahead; the Japanese system of automatic monitoring stations linked to a central agency point by telemetry provides one model — and the Chernobyl disaster, too, showed the advantage of automatic monitoring linked to an alert/alarm system. While we rarely experience in this country days when atmospheric pollution might trigger alerts because of danger to human health, one of the great advantages of an automatic monitoring network is that it permits efficient and optimum air pollution control at the regional and more local level. We require such infrastructure if we are to encourage industrial development where it is needed without creating further pollution problems in the wake of that development. Overall, we should aim to have a well co-ordinated national policy in which international requirements and regional needs are given appropriate weight.

After a long unsettled period when DOE and HSE have been jockeying for position, it is time to resolve the issue once and for all and inject new confidence into both the policymaking and enforcement arms of air pollution control. What better task for a newly appointed Secretary of State for the Environment? Let us have an agency for environmental protection within DOE which can co-ordinate research, policy-making and enforcement, geared to the requirements of tomorrow's world with the tools available today.

SHOULD BUSINESS CONSIDER THE ENVIRONMENTAL FACTOR?

A new book, "Healthier Profits", published with the support of the Environment Foundation, aims to show industry how a little thought and research devoted to environmental considerations can save a fortune in avoiding planning appeals or pollution claims. The author, **Steve Robinson,** *here describes the thinking behind his book, developing the theme of an earlier, 1984, Clean Air article.*

> **"Life or death, profit or loss, success or disaster; often the fatal error is not considering the environmental factor ..."**

The quote above is taken from the book, "Healthier Profits – Business, Success and the Green Factor" which aims to show managers the potential of profitable, competitive products and processes that happen to be environmentally kinder. The quoted words are easy to write – but how easy are they to prove? Just how relevant are environmental factors to managers? Certainly any mention of them, if not greeted by active scepticism, often seems to meet with yawning indifference.

While there are notable exceptions, this general lack of understanding the importance and influence of environmental factors is worrying. Worrying not solely from an ecological perspective but also an economic one, for environmental factors are very relevant to the vast majority of businesses. Though certain sectors, like oil and chemicals, are generally seen as being environmentally sensitive, a common immediate reaction to that statement is to try and think of businesses and sectors which are not. But once the scope of environmental factors and environment-linked risks is understood, finding such a business is difficult.

At first glance a credit card company may fit the bill. But if it has a sound energy management policy at its necessarily large central offices it is likely to make savings which go straight to the bottom line. It is taking a measure which improves its competitiveness yet which has resource conservation implications.

Finance houses and investment institutions might also appear indifferent to environmental considerations. But when their operations and influence are examined it can be seen that if that were the case they could be heading for a minefield. The companies they invest in might be abruptly subjected to tighter controls, loss of key sources of supply, hostility from protest groups and straight forward competition. And, of course, their own offices consume energy too.

Managers in some industrial sectors may dismiss environmental factors out of hand because they do not think these can affect their interests significantly, if at all. Yet, if they have avoided problems through a more cost conscious rival increasing their competitiveness through sound energy management, these same managers may be wrestling with COPA s58 noise notices, or could be writing off substantial project appraisal costs through an unexpected refusal of planning permission.

Simple managerial commonsense, however, like looking for alternative sources of supply or more cost effective production methods, may actually be reducing environment linked risks — consciously or not. Most managerial techniques are commonsense but their spread is often hampered by a lack of formal structure. There are managers who remember the growth of budgetary control after the war. Now, few people would seriously expect businesses to survive without it. A similar pattern has occurred with other management control techniques and so it is likely that the practice of accounting for environment linked risks is just in its infancy as an accepted routine decision makers' function.

Getting a commonsense approach more widely known is not that simple. The ideas have to be packaged into an easily understood and memorable form. The main problem is that until recently environmental factors have just not been considered in businesses. Profitable, environmentally kinder, products and processes already exist, usually having been developed for standard commercial reasons like greater cost effectiveness or market appeal. But not enough decision makers know of this area of opportunity. Put a handle on the teacup — name the types of technology they should be looking for — and wider acknowledgement of and planning for environment linked risks should follow when defining whether a new product or process falls into the newly named category.

In an earlier *Clean Air* article (Vol 14, No. 2 pp 50-54) I proposed that these profitable and competitive yet environmentally kinder products and processes be called **"Symbiotic Technologies"** or **"ST"**. This neatly describes their main attribute — that they benefit producers, consumers and other interested parties like governments or pressure groups as well as the environment. The book "Healthier Profits" develops this idea further and tackles the immediate challenge thrown at the concept of ST — where are the examples? Just one good example of a Symbiotic Technology should confirm the theory. Doubting it can be developed is then a bit like anyone witnessing the Wright brothers' efforts and still questioning the feasibility of powered flight because they had not yet seen a Jumbo jet. There are, however, many more than one example and expert contributors to the book on Industry, Waste, Energy Conservation and Agriculture provided them, though theirs is by no means an exhaustive list.

No one person has invented Symbiotic Technologies — they exist simply because of the commonsense benefits they offer those developing and adopting them. In some cases the advantages may include directly exploiting their ecological superiority, as with biodegradeable outboard engine oils developed for use on inland waters, or asbestos-free building materials. Waste control provides many good examples such as the case of ICI, where a cheap process change to reduce ammonia discharges gave annual savings of £80,000 in reagent costs and £200,000 in effluent treatment expenditure.

In other situations conservation, rather than pollution, just happens to be the by-product of a new development. The drive for more fuel efficient cars, for instance, is powered more by consumer interest in cheaper motoring than concern for global oil reserves. Indeed the whole of the energy conservation industry, from loft insulation through

Costs reduced dramatically
The new pollution control equipment also consumes 40 per cent less energy than the catalytic
incorporation of a secondary heat recovery system to the fresh air intakes at the roaster burner boxes.
Oxidiser unit destroys fumes and saves fuel
New equipment has been installed at the brewery.
The oxidiser unit is expected to produce significant savings in fuel by using a heat exchanger to heat fresh air being drawn
Lowest practical fuel costs
The system contains nearly two and a half miles of tubing making up the heat exchanger – a piece of equip-
positive return on investment
The thermal oxidiser plant has
collected more than 99.5 per cent
Payback within months
This incremental cost for the heat exchanger is paid back in
approximately one shift year by the savings in fuel costs. If two or three shifts are operating, the payback time is just several months.
POSITIVE EFFECT ON PROFITS
Waste gases are incinerated at high oxidation temperature to clean and remove odour nuisance, recovering the heat value contained in the gases and

Metal Box Air Pollution Control Systems. They help you clean up in more ways than one.

Metal Box thermal oxidisers convert contaminated fumes into clean carbon dioxide and water vapour exhausts which more than meet governmental guidelines.

If you add primary heat recovery you will find savings impressive. If you feed secondary heat recovery back into your process, to generate steam for example, you'll find a real payback with a return on investment.

These top-selling systems from Smith Environmental Corporation are made under licence by Metal Box who are set up specifically to help manufacturers, using solvents in furniture, chemicals, paint, printing and many other industries. They engineer a complete system and take the headache out of major projects of this sort.

Try them for anything. Because the combination of Smith's energy-saving technology and Metal Box's engineering and servicing skills makes these systems potentially the most profitable in the business.

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Reader Enquiry Servive No. **8615**

microprocessor control units to contract energy management packages, has grown up for much the same reason — people being interested in making or saving money.

Demonstrably making or saving money is mainly what Symbiotic Technologies are about. People develop them because they see a market, others buy them because of the direct immediate advantages they hold. Low volume spray applicators and the new Agrobiological sprays, where genetically engineered pathogens have been targeted on specific crop pests, are classic examples holding cost advantages for both producers and users over conventional pesticide alternatives.

That last word, alternatives, is perhaps the crux of both the ST and environment linked risks issues. Generally in business when something new arrives, something old declines: films have given ground to TV, canals to railways which in turn were overtaken by the automobile, and local stores have given way to supermarkets. By their nature Symbiotic Technologies are more competitive than their older conventional rivals. Companies, whether they make cars, bottles, tin cans, aerosols or building materials, which want to remain competitive and in business will have at least to understand ST even if they do not actively research and develop it. That is because displacement from a market by a competitor with a Symbiotic Technology is the ultimate environment linked risk.

And there is a further twist. The possibility of stiffer legislation and controls on the conventional ecologically sensitive products and processes in a market will not worry a competitor with a Symbiotic Technology. Worse still, they may actively support the proposed new laws, especially if the conventional rival holds a price advantage. Lead free anglers' weights will be given a legislative advantage if and when a ban on traditional lead weights takes effect. There is a tendency for decision makers at this point to retreat into the final hole of "It'll never happen to us". But lead is coming out of petrol. And legislation has been introduced to restrict the amount of tri-butyl tin in marine anti-fouling paints, despite there being no good alternative at present. Now there's a good ST opportunity ....

Editor's Note: "Healthier Profits — Business, Success and the Green Factor", edited by Steve Robinson, is published by the Environment Foundation and promoted by the Conservation Foundation and the Commonwealth Institute. It is available direct from the Conservation Foundation, 11a West Halkin Street, London SW1, Tel 01 235 1743, price £5.95 plus £1.00 p&p.

MULTINATIONALS AND POLLUTION

A new report, "Multinationals and Pollution" by Michael Royston (John Wiley & Sons, £12.00) was launched with a debate on the subject hosted by the report's sponsors, the Institute for Research and Information on Multinationals (IRM). The report purports to show that multinationals are taking environmental issues much more seriously and that despite the bad reputation they currently have, due to 'a tiny minority of offenders', recent catastrophes such as Bhopal will oblige all multinational companies to increase their environment-consciousness.

DIVISIONAL NEWS

NORTHERN DIVISION

Autumn meeting of the Division, held at the British Gas Research Station, Killingworth, 29 November 1985.

Mr. D. Williams, Regional Development Manager of Norgas, welcomed members to the meeting at the Norgas Research Station. The meeting commenced after a buffet lunch which was kindly provided by Norgas.

The subject of Mr. Williams' illustrated talk was "Gas in the 90s". The gas industry, he said, aimed to tailor heating systems to meet the particular needs of the consumer. The current trend in the private housing sector was for small units. This trend, coupled with improved insulation in homes (required under recent Building Regulations), meant that lower output heating systems were in demand and the industry's designs were meeting this need. On the same theme of energy saving, Mr. Williams said that the industry was now achieving efficiency levels of up to 95%, in contrast to former levels of 60%; this was as a result of the greater flexibility in installation that the new designs allowed.

Development work had also focused on modular heating systems which could be extended and adapted as circumstances changed: these were particularly popular with young couples setting up home and with elderly people.

Current known reserves of gas would last well into the 21st century; British Gas was fully conscious of the needs of future housing and technological development and was, in fact, frequently in the vanguard of modern design.

Mr. N. Robsinon, Chief Environmental Health Officer at Chester-le-Street, expressed interest in the new developments and felt confident that the industry would have considered the safety factors necessary, especially with smaller housing units. He proposed a vote of thanks from the meeting for Mr. William's talk and for the generous hospitality offered by the Norgas Organisation — a sentiment strongly endorsed by the Chairman, Cllr. L. Poole.

W.C.B. Robson
Hon. Secretary

NORTH WEST DIVISION

Visit on Wednesday 19th February 1986, to the Waste Disposal Plants, Salford and Radcliffe and Lecture on the "Manoil" process at UMIST.

Forty-five members of the Division visited Salford on a bright but cold day and were shown round one of the 600 tonne/day waste treatment plants. This partially sorts domestic and some trade refuse and then compacts it into standard containers. These are loaded onto rail wagons and despatched to a large tip at Appley Bridge. A coach then took the party to lunch and on to Radcliffe where a small older plant is being used for experimental shredding and sorting of waste. Some of the shredded paper and plastic is further separated and the paper is made into a pulp cake.

This can be used by paper processors but some has been used as feedstock for the Manoil process. This is a process developed by the University of Manchester Institute of Science and Technology (UMIST) in conjunction with the Greater Manchester County Council.

The coach took the party to UMIST where Professor McAuliffe outlined the background to the development and explained the process simply. Under pressure and heat the cellulose in refuse, straw, sugar cane residues and other similar materials can be broken down to form sulphur-free oil. The principle has been known for some time but UMIST has developed this into a continuous process with waste slurry in, and oil out, in about 10 minutes instead of several million years as is the natural process. There is great potential for Third World Countries and the team is hoping for further development sponsorship leading to commercial production.

The party were conducted round the development laboratories and questions were answered by the staff. Sincere thanks were expressed to County Councillor W.J. Shaw, and Mr. Bult of GMC's Engineer's Department and to Professor McAuliffe of UMIST for a very interesting visit.

J.B. Douglas
Hon. Secretary

EAST MIDLANDS DIVISION

Meeting of the Division held at the works of Robinson and Sons, Wheat Bridge, Chesterfield on 10 April 1986.

Opening the proceedings, the Chairman of the Division, Cllr. F.E. Holland, introduced the Mayor of Chesterfield, Cllr. T.E. Whyatt who extended a Civic Welcome to the Borough. The Chairman then introduced Mr. Colin R. Williams, Production Director of Robinson and Sons, who gave a brief presentation on the firm's activities. A private company, the business having begun in 1839 with the manufacture of pill boxes and two employees, the firm now manufactures a wide range of both rigid boxes and folding cartons, an equally wide range of hygienic dressings, and employs some 2000 people. The manufacture of dressings dates from the Crimean War and is said to owe a good deal to the demand by Florence Nightingale — another well known personality from the County of Derbyshire — for clean dressings for use in the military hospitals.

One of the particular items of interest at the factory was a Gibson-Wells Fluidised Bed Boiler commissioned in 1985. As a preliminary to visiting the boiler house members were addressed first by Mr. Martin Cruttenden, Regional Marketing Director of the NCB's Midland Sales Region, and then by Mr. Trevor Butler, one of the NCB's Fuel Technologists.

Mr. Cruttenden outlined the importance attached by the NCB to the use of coal by industry, where the Board saw the real growth prospect. Mr. Cruttenden set out the gains and losses in terms of coal users but said that growth in coal usage was moving forward slowly. Mr. Cruttenden referred to the effects of the sharp reduction in oil prices but, with the 25% conversion grants and improvements in grants from the EEC, conversion to coal was still taking place albeit more slowly.

Mr. Butler described, with the help of slides, the operation of the boiler plant and the high efficiency multi cell grit arrester.

Mr. Cruttenden and Mr. Butler dealt with a number of questions but discussion had to be concluded to allow parties to visit the Impregnated Wipes Department, the Portland Works (carton manufacturing), the Boiler Plant, the Elasticated Nappy Plant and the Cotton Wool Departments.

Arrangements had been made for members who so wished to obtain lunch at Messrs. Robinsons and almost forty people who availed themselves of this facility had an excellent meal. During the lunch period there was an opportunity to visit the Company's Muniment Room and this provided an absorbing history of the company in terms of the written word, pictures, and the many products and other items on display.

Following lunch there was a further round of visits before returning to the meeting room for afternoon tea.

At the close of the meeting the Divisional Chairman expressed thanks to Mr. Colin Williams and through him to Robinson and Sons and to all who had contributed in any way to the arrangements for what had proved a most interesting and worthwhile day. The thanks of the Division are also due to Mr. J.B. Brackenbury, Chesterfield's Borough Environmental Health Officer who suggested the visit and liaised with Mr. Williams in making all the arrangements.

E.F. Raven
Hon. Secretary

NSCA ASBESTOS WORKSHOP

The NSCA's 1986 Spring Workshop was a great success, with total attendance approaching 140. The papers and reports of discussions provide an invaluable guide to: asbestos hazards; removal techniques; action guidelines. The Proceedings of the Workshop (2 volumes) are available from the NSCA, price £9.25. The NSCA is also about to publish a leaflet on *Asbestos* for the general public. Ask for sample copy.

BOOK REVIEWS

Health Hazards and Biological Effects of Welding Fumes and Gases – Report on an International Conference (Copenhagen 18-21 February 1985). Published by WHO Regional Office for Europe Copenhagen (1986).

This publication reports on a conference convened by WHO in order to establish the current state of knowledge concerning effects of welding on health and to discuss priorities for reducing risks and for future studies within this large industry.

The following four main areas were considered: the nature and quantity of welding fumes and gases produced by various welding techniques; measurements of exposures to welding fumes and evaluation of their effects on experimental animals and cell cultures; epidemiological evaluations of the health of welders; and methods for minimising the respiratory health risks faced by welders.

Because welders frequently inhale high concentrations of fumes and gases during their work, interest in potential health problems has centered on respiratory effects, including lung cancer, particularly in relation to the presence of chromium and nickel in the fumes of stainless steel welding.

High concentrations of particulate fumes and gases are produced whenever an arc is struck or a flame is used to melt the parent metal. A number of factors affect the total amount of fume produced per unit time by a given process and application. The composition of the fume is primarily determined by that of the consumable which contributes 80-95%, but the type of consumable used is in turn determined largely by the chemistry and metallurgy of the parent material, eg aluminium alloy wire is used only on aluminium parent metal. The fume consists mostly of the condensed vapour of the core wire, but the oxidising potential of the arc (which depends on various factors particularly the type of shielding gas or flux), determines the relative amount and composition of the fumes and gases. The presence of flux-forming coating also contributes significantly to the non-metallic components of the fume. Each welding technique and application produces a characteristic range of particulate composition and morphology.

Furthermore, welding produces a number of gaseous pollutants, either through the thermal decomposition of the electrode coating (CO, CO2, F, HF etc.) or via the pyrolytic decomposition of organic substances such as paint, anti-rust coating etc. NO and NO2 are also produced from the surrounding air. Inert gas welding of aluminium and stainless steel is accompanied by production of significant concentrations of ozone, due to the interaction of ultraviolet radiation and oxygen.

A number of factors affect the immediate and average breathing zone concentrations.

A major one is the length of time which a welder actually welds; in addition, effective general ventilation may greatly reduce background steady state fume levels. Effective use of local exhaust and point extraction reduces both the TWA and peak breathing zone levels.

As to health effects, both acute and chronic respiratory effects occur amongst welders, but they appear most marked in stainless steel welders. There is also consistent evidence of a moderate increase in lung cancer risk among welders. The International Conference has drawn up a list of conclusions and recommendations which are included in this report and should serve as the basis for future monitoring and control strategies in industry wherever welding is practised.

*The Environmental Consequences of Nuclear War – the SCOPE ENUWAR study, Vol 1, Physical and atmospheric Effects (*1986), Eds. Pittock et al.; *Vol II, Ecological and Agricultural Effects* (1985), Eds. Harwell and Hutchinson. Published by John Wiley, Chichester, England.

Scope 28, Volume 1 (ISBN 0471 90918 1), 408 pp, price £35.00; Volume 2 (ISBN 0471 90898 3), 526 pp, price £43.50.

The immediate effects of nuclear detonations would be devastating. But in the longer term, the large scale and indirect effects would place unprecedented stress on all the biological constituents of Earth. Projections of darkness at noon and sub-freezing temperatures are too sweeping to allow the total impact of nuclear war to be thoroughly understood, but it is already clear that the greatest consequences to humans will arise not from blast or radiation, but from the mass starvation brought about by substantial global climatic and other disturbances which would follow a nuclear exchange of around 5000 megatons.

Such an exchange would drastically reduce the light levels in the mid-latitudes of the northern hemisphere, causing a severe temperature drop within days. Rain patterns would also be disrupted.

The suggestion that smoke and soot generated by large urban and forest fires might cause reductions in light at the Earth's surface, inducing profound changes in weather, was first made in 1982. SCOPE – the Scientific Committee on Problems of the Environment – recognised the need for greater understanding of the environmental consequences of nuclear detonations, and later that year established a steering committee on the Environmental Effects of Nuclear War (ENUWAR). The results of more than two years' of SCOPE-ENUWAR studies are published in two volumes, which present a general consensus among the scientists concerned of effects on climate, ecosystems and food supply which could follow a major nuclear exchange.

The first volume on physical effects focuses on the nuclear winter and potential effects including: reductions in stratospheric ozone, and, after smoke had cleared, associated enhancement of ultraviolet radiation; significant global-scale radioactive fallout; and localised areas of toxic air and water pollution levels. The second volume investigates the vulnerability of natural ecosystems and agricultural systems to the types of perturbations possible after a nuclear war.

In the short-term, extreme temperature changes in certain regions or in the active growing seasons could be extremely damaging. A drop of 3-5°C at the beginning of the growing season would destroy the North American and Soviet grain harvest. More seriously, the rice crop might also fail if at any time during the growing season the temperature dips below 15°C. This would affect huge populations in South east Asia, China, India and Africa.

FUTURE EVENTS

19 SEPTEMBER 1986 – CONFERENCE – 'Acid Rain – The Political Challenge'
Organisers: NSCA and IEEP (Institute for European Environmental Policy)
Sponsored by: The Commission of the European Communities
Speakers: Stanley Clinton Davis, Environment Commissioner, EEC; Mrs. Angela Rumbold, MP, Under Secretary of State, DOE; Lord Marshall of Goring, Chairman of the CEGB; Sir Hugh Rossi, MP; Beate Weber, MEP; and speakers from the United States and Scandinavia (to be announced).
To be held: The City Conference Centre, London
Details: Jane Dunmore, NSCA. Telephone 0273 26313

16 - 17 OCTOBER 1986 – CONFERENCE and EXHIBITION "Combustion 86" – the 52nd Annual Conference of the Combustion Engineering Association.
Subjects to be covered: Physics of combustion; Combustion on conventional plant; Fluidised bed combustion; Furnaces; Combustion of liquid and gaseous fuels; Two-stage combustion; Future developments; Combustion technology in Europe; Biomass; Incineration; Alternative Fuels.
To be held in: Selsden Park Hotel, Croydon, Surrey.
Registration and details: CEA, Mount Lodge, Station Parade, London Road, Sunningdale, Berks SL5 0EP. Telephone 0990 25035.

27 – 30 OCTOBER 1986 – 53rd CLEAN AIR CONFERENCE

The full programme for this major NSCA event has now been published and distributed. Contact Peter Mitchell at the NSCA if you have not yet seen your copy. Speakers include Angela Rumbold MP, junior Environment Minister, and Stanley Clinton Davis, Environment Commissioner EEC. Sessions on: pollution control; CHP; air pollution updates; noise; ozone and carbon dioxide. *Full details* – Tel. 0273 26313.

1987

24 - 27 MARCH — INTERNATIONAL CONFERENCE — "Environmental Protection of the North Sea"

To be held in London

Subjects for discussion will include pollution effects attributable to: organic chemicals; heavy metal compounds; nutrients, microbiological contaminants; activities of oil and oil related industries. Also, requirements for legislation and monitoring to safeguard the North Sea.

Details: Water Research Centre (Environment), Henley Road, Medmenham, PO Box 16, Marlow, Bucks. SL7 2HD, UK. Telephone 0491 571531, Telex 848632.

CALLS FOR PAPERS AND CONFERENCE PREANNOUNCEMENTS

2 - 3 SEPTEMBER 1986 — CONFERENCE "INPARTECH '80" (a two day Conference on Particle Size Analysis)

Organisers: The Filtration Society

Theme: Recent developments in the practical applications of particle size analysis methods to industrial and environmental problems. The Conference will be complemented by an Exhibition of the latest equipment from manufacturers and suppliers.

Papers on suitable topics are invited.

Prospective authors should contact (write or phone) either of the Conference Co-Chairmen:

Dr. Albert Rushton
Department of Chemical Engineering,
UMIST,
P.O. Box 88,
Sackville Street,
Manchester

Tel: 061-236-311

Dr. A.S. Ward
Department of Chemical Engineering,
University of Technology,
Loughborough,
Leics LE11 3TU

Tel: 0509 232663

3 - 5 NOVEMBER 1987 — CONFERENCE "Vehicle Emissions and their Impact on European Air Quality"

Organisers: Institution of Mechanical Engineers (Conf. Dept. C350), 1 Birdcage Walk, Westminster, London SW1H 9JJ. Tel: 01-222 7899, ext. 234. Telex: 917944.

Theme: A review of measures for the control of motor vehicle emissions (car, truck and bus), the resulting benefits to European air quality, possible solutions, and the consequences for the automotive industry.

Subjects to be covered include:

The concerns underlying further reductions in road vehicle emissions; Review of regulatory options; Review of emission control technology; Effects of emission controls on vehicle design and performance; Implications for the motor industry; Implications for the consumer.

Synopses of papers (250 words, English language) required by 25 August 1986.
Draft papers required — 1 January 1987; Final manuscripts — 1 May 1987.

ACCESS TO ENVIRONMENTAL INFORMATION

Health and Safety Executive

In March 1986 the Health and Safety Commission issued a statement of its policy on public access to health and safety information. The policy is mainly concerned with helping to safeguard members of the public living or working near industrial sites. The statement follows a widespread consultation exercise which was intended to elicit comment on the basic principles of access to information and specific suggestions for further action.

The main element of the policy, unchanged from the consultation document, is that industry and the HSE should play a mutually reinforcing role in providing access to health and safety information, with industry having the primary responsibility for disclosure. The Executive is to maintain public registers of the names and locations of local premises where hazards might arise. The Executive has promised always to release information directly needed for the purpose of protecting people's health and safety, but feels that it is generally not the best judge of the confidentiality or otherwise of most information in its possession, or whether indeed that information is comprehensive and up to date. For these reasons, it has put the onus on industry to release the information.

HSE has stated that industry should be clear as to the principles on which it is expected to operate, and the CBI has said that it will draw up a Code of Practice to give guidance to employers.

Among the notifiable installations which the Executive will keep on accessible registers are those subject to the Nuclear Installations Act 1965, the Notification of Installations Handling Hazardous Substances Regulations 1982, the Asbestos Licensing Regulations 1983 and the Control of Industrial Major Accidents Hazards Regulations 1984. The Executive will also keep available for inspection at its Area offices registers of any licences, certificates or orders granted by the HSE under which local concerns operate, and also a register of convictions of local undertakings under health and safety legislation.

If an employer declines to make available information about incidents involving an actual release of hazardous substances into the environment, the HSE has stated that it will release "appropriate information in its possession" and will inform the employer that it has done so.

As local authorities have an important role in enforcing health and safety legislation the Health and Safety Commission will be consulting them on the need to co-ordinate policies in the field.

The arrangements for disclosure of information by the HSE do not cover release of information held by the Industrial Air Pollution Inspectorate. An Interdepartmental Working Party has been considering public access to information held by pollution control authorities; their findings were published in April 1986, in *Public Access to Environmental Information* (Pollution Paper No. 23).

Industrial air pollution

Readers may recall that in its 10th Report, RCEP said that there should be a presumption in favour of unrestricted access for the public to information which pollution control authorities obtain or receive by virtue of their statutory powers. But the Commission also said that there was a danger of information freely volunteered by industry to authorities drying up if it was all to be made accessible to the public.

Despite this, the DOE Working Party decided to consider the practicality of a general approach whereby *all* information available to a pollution control authority, with only specified exceptions, should be made available to the public. But it seems swiftly to have been brought round to RCEP's point of view and within a few paragraphs the Working Party dismisses its initial approach with, it appears, the example of the Industrial Air Pollution Inspectorate (IAPI) very much in mind. The report states that the risk of causing the supply of information to dry up applies particularly in cases where the pollution control authority employs a co-operative rather than confrontational approach and thereby acquires a great deal of information, not all of which is required for the immediate discharge of its statutory details.

It would, the report states, be both administratively complex and costly to attempt to specify, in a way which would ensure a continued flow of information from industry, particular categories of volunteered information which should be exempted from public access. Hence, as far as air pollution is concerned, the Working Party lends its support to the idea that registers of prescribed particulars along the lines of the COPA Part II model will provide a "suitable means of improving public access to air pollution information". Bearing in mind that water registers refers to a system of specific consents (rather different from the practice with air pollution control, where polluting emissions might be discharged not only through controlled outlets but also from leaks, stockpiles etc) the Working Party suggests that the main elements of BPM agreements relating to abatement of discharges should be put onto registers.

As to premises controlled by local authorities, the Working Party points out that where local authorities exercise their discretionary COPA section 79 powers they are already obliged to establish registers. However, there is no recommendation that these discretionary powers should become mandatory. Discussing the issue, the Working Party concludes that there has been insufficient public demand for such information to burden local authorities with the costs and man hours involved in a mandatory system of registers for every plant controlled by local authorities. An exception will be where local authority powers have been extended to cover certain specified industrial processes to meet the UK's obligations under the EC Framework Directive. Here, specified elements of the industry's BPM agreements with both IAPI and local authorities would be made available to the public, on registers held at both Inspectorate and local authority offices.

The report itemises the sort of information that might be involved:

- emission limits
- the nature of raw materials processed or fuel used
- the height and mode of discharge of any emissions
- the carrying out of tests and keeping of records
- the use and method of operation of control equipment.

The Working Party's recommendations refer to the consultation paper on air pollution legislation "currently being prepared" (and long awaited!) which, it is said, will also "propose that local authorities should be able to place on these registers information about the exercise of their controls under the Clean Air Act and the Public Health Acts".

When the NSCA was preparing its evidence on access to environmental information, our local authority members were very concerned about the resource implications of any system giving the public wider access to local authority files. In a terse comment, the report states:

> "The initial setting up of public registers and their subsequent maintenance will have resource implications for the Inspectorate (IAPI) and local authorities. However, seen in the context of the wider proposals to be put forward in the forthcoming consultation paper on air pollution control, these are not expected to be very significant."

A tantalising comment! But when will we know more?

Protection for industry

As to industry, their rights and freedoms look like being fully protected. This is no bad thing, but as some companies have found, it can pay to allay public concern before it arises and provide full information on the activities and impact of a particular plant to the residents in the area. There is no obvious reason why monitoring results should not be published on registers, at least a regular summary of results of monitoring undertaken by the plants themselves supplemented by results of any monitoring undertaken by the enforcement authorities. It is not at all clear however, that this information will in future be routinely divulged for the scheduled processes.

Noise

Further access to information on noise is dismissed almost out of hand by the Working Party. The report refers to the provisions of COPA Part III and then says,

> "By its nature, noise nuisance is not concealed, and members of the public are not dependent on information being available to know that a noise source is annoying."

A remarkable observation. Members of the public are possessed of very acute ears if they can both distinguish the particularly annoying element of noise from the growing background levels in cities, and then ascribe it to a particular source. The comment, too, makes no allowance for the disturbance caused by low frequency noise, the source of which is often impossible for the layman to determine. Still, the Working Party sees no reason why the public should not have a helping hand.

> ". . . It is recommended that local authorities should be advised, subject to any legal restrictions, to make available information collected in the course of investigating a noise nuisance when requested to do so."

Most of the report is worded in this cautious and bureaucratic style, which is a great disappointment. Although there are some recommendations of substance to welcome and praise, the overall tone is still that of our masters deciding what it is good for us to know. Some local authorities may welcome this. They may be relieved that their diminished resources are not to be further taxed by the need to provide everyone on request with all sorts of information which might have the undesirable effect of causing alarm. But many more will feel that their wholehearted support for wider freedom of information has been gently snubbed in a central government exercise designed to acknowledge changing public expectations without really accommodating them.

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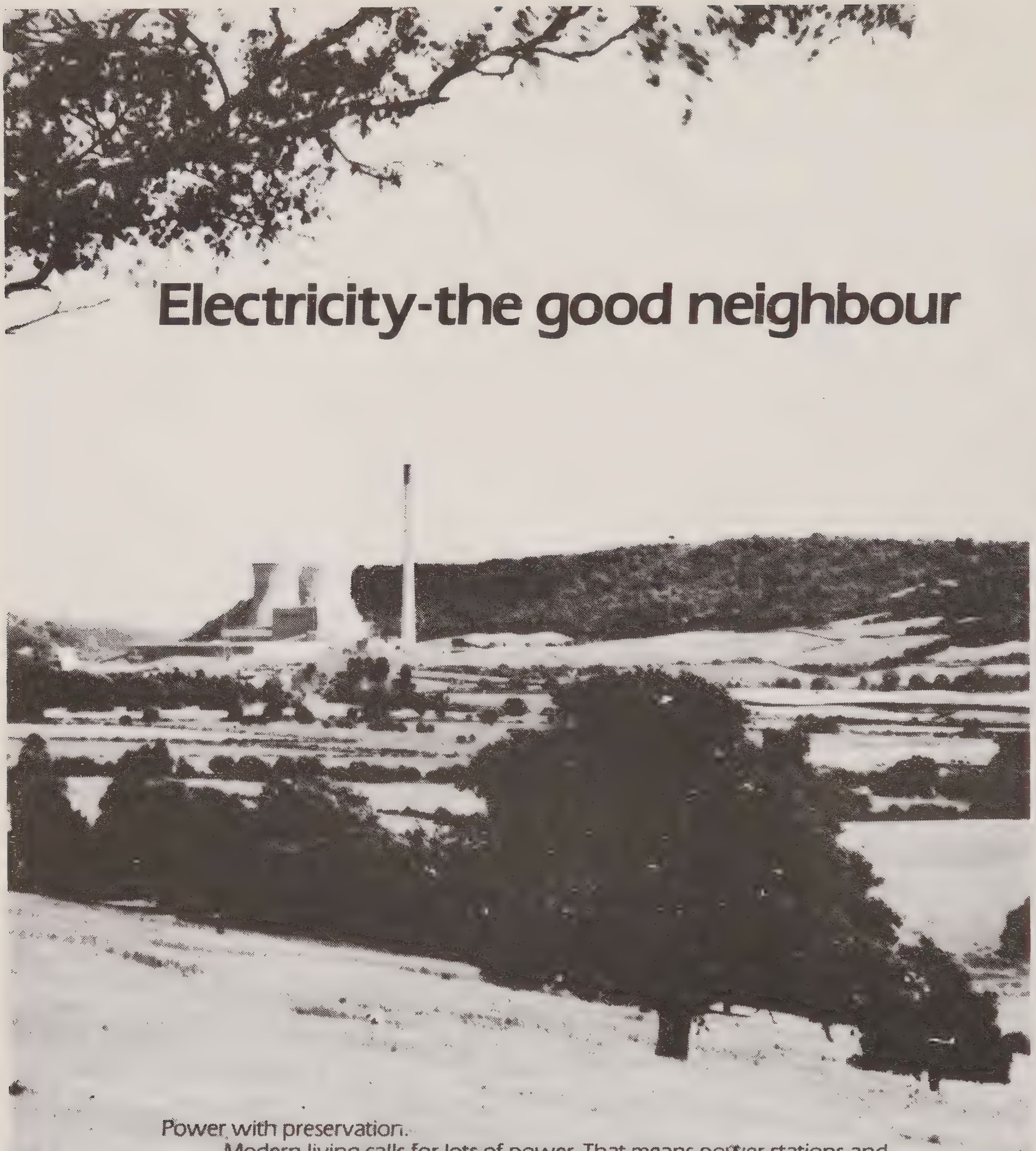

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iuappa newsletter

THE INTERNATIONAL UNION OF AIR POLLUTION PREVENTION ASSOCIATIONS

The following items have been extracted from the April 1986 IUAPPA Newsletter. The full Newsletter is available on request.

NEW DIRECTIONS IN EEC ENVIRONMENT POLICY

Atmospheric pollution ranks first among the "pressing environmental problems" which the Commission of the European Communities has identified as requiring urgent action in a discussion document *"New directions in Environment policy"*, published in February 1986. This states that in addition to proposals already on the table to reduce emissions from motor vehicles and large combustion installations, the Commission will be making a series of further proposals as soon as possible, all concerned to reduce emissions or establish acceptable air quality standards. These are to include proposals relating to emissions from vehicles over 3.5 tonnes, particulate emissions from diesel vehicles, speed limits and the sulphur content of heavy fuel oil and coal. The Commission's view is that early decisions are necessary to achieve substantial reduction in pollution of the atmosphere from all major sources.

The Commission is currently considering the framework and content of the Community's Fourth Environmental Action Programme. This will to some extent carry on the policies laid down in previous action programmes, the Third of which, adopted in 1983, committed the Community to a preventative policy that integrates environmental requirements within the planning and execution of economic activities. But the 4th Environmental Action Programme should not only give a new impetus to environmental policymaking at Community level, but will aim to foster a new level of awareness about the importance of environmental considerations.

Biotechnology, for example, has been identified as offering great potential both as a major growth industry of the future and as a potent means of dealing with many environmental problems, especially those related to waste streams and waste management. But, the Commission warns, it may carry serious environmental risks which must be recognised and prevented.

As to energy policy, energy production in the Community is heavily dependent on the use of fossil fuels and thus atmospheric pollution issues are inevitably linked to energy policy decisions. In turn, environmental requirements affect energy costs and the competitive balance of different energy sources. The Commission's recent communication on new Community energy objectives (COM (85) 245) stated that the balanced pursuit of environmental and energy policy objectives is of special importance. The Commission's concern is not only to ensure development of alternative non-fossil energy sources but to forewarn itself with timely research on the development of atmospheric pollution impacts on a global scale, such as the "greenhouse effect".

The Commission has defined eight "orientations" to guide the Community's immediate response to environmental challenges. First amongst these is that a strict environment policy is essential to and fully compatible with long-term economic growth, and can contribute to job-creation. Secondly, the Commission states that prevention should remain the key objective of environment policy. Practical steps should be taken to ensure the integration of environment policies with other major policies, plans and programmes on a day-to-day basis both at Community and national level. The fundamental importance of the Polluter Pays Principle is restated and the Commission urges that it should be developed and applied more widely.

An interesting new area of emphasis is on the implementation of environmental policy in disadvantaged regions and declining industrial areas of the Community, which should, the Commission says, be assisted (although whether from national or Community funds is unclear). The Commission emphasises the importance of a multi-media approach to avoid transfer of pollution between environmental sectors, urges that increased attention be given to effective implementation and enforcement of environmental policy and to its practical results on the ground, and finally states that the European Year of the Environment (1987) should be seen as a major opportunity to raise awareness of the importance of environmental issues, and to change attitudes.

Commission of the European Communities. New directions in environment policy. (Communication from the Commission to the Council). 19.2.1986. COM (86) 76 Final.

HISTORICAL US DATA CONFIRM LINK BETWEEN ACID RAIN AND LAKE DAMAGE

A detailed review of historical records and other evidence dating from the late 1800s to the present reveals that acid rain has damaged certain lakes in the northeastern United States, but that the extent of the problem varies widely across the region.

A 3-year study released in March 1986 by a National Research Council (NRC) committee concludes that a causal relationship links sulphur emissions produced by fossil fuel burning with formation of acid rain and, subsequently, with acidification of sensitive lakes and streams. Comparison of historical chemical data with recent measurements at several hundred lakes in New Hampshire, New York, and Wisconsin showed that many lakes had become more acidic over time. Where (in a limited number of cases) fish surveys had been done the increased acidity was also shown to be associated with decline in the fish populations.

At the same time, the NRC committee found wide variability in the way the acidity of individual lakes has changed over time. Many lakes in the three states have become less acidic since early this century. Others have become more acidic than might be expected from changes in rainfall acidity. The report suggests that the response of individual lakes to acid rain may be influenced by characteristics of surrounding soils and watersheds. Further, it suggests that decreases or very large increases in acidity may be due to the influence of other human activities such as farming or forestry.

The strongest evidence of environmental effects from acid rain were revealed in studies of the Adirondack Lakes of New York state. Analysis of sediment cores removed from lake bottoms suggest that natural acidification processes normally take hundreds or even thousands of years to produce an increase in acidity of 1 pH unit.

In contrast, some lakes in the Adirondacks Mountains have apparently experienced this magnitude of increased acidity over a period of just 20 to 40 years in the middle of the 20th century. For example, Big Moose Lake had, according to diatom samples, a pH of 5.8 prior to 1800. But from about 1950, the diatom-inferred pH dropped markedly to its current level of 4.9. At the same time the number of fish species in the lake declined from 10 in 1948 to 5 or 6 in 1962. In contrast, though, Lake Sagamore in the Adirondacks showed only a slight drop in pH over the same period – from 6.3 prior to 1800 to 6.1 currently. The number of fish species also showed no major change, indicating that no significant acidification has taken place.

Copies of the report, *Acid deposition: the long-term trends* are available from the National Academy Press. Mail orders may be sent to the NRC's Publication Sales Office, in room 700, 2100 Pennsylvania Ave, NW, Washington DC 20418, USA. Price: S24.50 (prepaid).

US PROGRESS ON ACID RAIN PROGRAMME

President Reagan and Canadian Prime Minister, Brian Mulroney, met in March with acid rain high on the agenda. After the meeting President Reagan fully endorsed a 5-year S5 billion "commercial demonstration programme" for acid rain control technology: the programme was as recommended in the joint report of special advisers Drew Lewis and William Davis. Details of how the Reagan administration plans to implement the programme are still sketchy. The administration will be asking Congress for additional appropriation, but how much and from what source is not yet determined.

The White House statement recognised acid rain as a "serious environmental problem in both the United States and Canada with transboundary implications for both countries". However, no specific SO_2 emission controls were recommended, an omission which has been criticised in several quarters. But the Canadian Premier called the Reagan endorsement a "new and very significant move in the long and difficult road towards purifying our two environments". At the same time he promised to keep the issue "on the front burner".
Meanwhile, two new bills, a concurrent resolution, and an amendment to a pending bill – all on acid rain – were introduced in the US Senate in March. Among these, a major new Bill proposed by Senators Stafford, Mitchell and ten others calls for stationary source emission limits on SO_2 and NOx, and vehicle emission limits on NOx.
(Source: *EEI Washington Letter,* published by the Edison Electric Institute, number 10, March 21 1986)

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UPDATE

NEW CENTRAL ENVIRONMENTAL UNIT AT THE DOE

The DOE has announced the setting up of a new Central Unit at the Department of the Environment. The Unit has been formed to help strengthen internal DOE management of environment and conservation issues and will aim to give environmental policymaking a higher profile. It will seek to tie environmental policies in with other government policies and forge links with other government departments in the process. In effect, it will do in a small way at national level what the Commission hopes can be achieved Community-wide.

The new Central Unit on Environmental Issues is to be headed by Roger Bright (currently an Assistant Secretary) and will report through Mr. John Rowcliffe, shortly to take over as Under Secretary, Central Directorate of Environmental Protection, to Dr. Martin Holdgate, Chief Environment Scientist and Deputy Secretary, Environment Protection.

In a redistribution of duties following the appointment of Sir Peter Harrop as Chairman of the UK Committee for European Environment Year, Dr. Holdgate has assumed responsibility for water quality, water resource management and privatisation of the water industry.

The new unit will not include representation from the Industrial Air Pollution Inspectorate and it is quite separate from the concept of a combined pollution inspectorate or a UK environmental protection agency. Proposals for forming such bodies has been put forward at the highest level within government but no decision has yet emerged.

RCEP AGENDA

The Royal Commission on Environmental Pollution has announced the choice of subjects for its next major studies. Following a review of priorities, the Royal Commission, under its new Chairman, Sir Jack Lewis FRS, has decided to study:

- the release of genetically engineered organisms to the environment;
- fresh water quality;
- the concept of best practicable environmental option (BPEO) as an aid to decision making in pollution control.

The Royal Commission will be establishing a timetable and detailed terms of reference for each of these studies and inviting evidence from interested organisations and individuals during the next few months.

The purpose of the BPEO study is to develop the practical application of a concept which the Commission has consistently advocated. The study and its conclusions will be the Commission's contribution to the European Year of the Environment, which starts in March 1987.

EUROPEAN YEAR OF THE ENVIRONMENT UK National Committee Appointed

Sir Peter Harrop KCB has been appointed Chairman of the National Committee which is to co-ordinate the UK's participation in the European Year of the Environment (EYE). Sir Peter was, until April 1986, Second Permanent Secretary at the DOE.

Others appointed to the UK EYE Committee are:
Dr Caroline Jackson MEP; Sir Hugh Rossi MP; Peter Hardy MP; Sir Derek Barber (Chairman, Countryside Commission); William Wilkinson (Chairman, Nature Conservancy Council); Prof. Sir Hans Kornberg (Former Chairman, Royal Commission on Environmental Pollution); Richard Sandbrook (Vice President, International Institute for Environment and Development); Nigel Haigh (Director, Institute for European Environmental Policy, London); Tom Burke (Director, Green Alliance); Robin Grove-White (European Environmental Bureau); Sydney Fawcett CBE (Former Deputy Chairman, National Farmers' Union); The Earl of Cranbrook; Don Barnett (Former President, Institution of Environmental Health Officers); Prof. R. Buchanan (Chairman, Northern Ireland Environment Group); Prof. R Edwards (Deputy Chairman, Welsh Water Authority); Roger Carr (Chairman, Countryside Commission for Scotland); and Alexander Trotter (Chairman, NCC Scottish Advisory Committee). Further appointments are expected to be made shortly.

EYE will run from March 1987 to March 1988 and a wide ranging programme of UK events is to be organised, including general awareness campaigns, model environmental protection projects, and environmental quality surveillance. The Chairmen of the 12 national committees representing the Member States of the European Community will form a steering committee, chaired by Environment Commissioner, Mr. Stanley Clinton Davis. This committee will co-ordinate efforts at Community level and carry out its own programme of Community-wide activities. The steering committee has a small fund within the Community budget at its disposal, some of which will be available for national committees. However, the UK committee will rely to a large extent on voluntary contributions and co-operation from the many bodies it hopes to involve in its work.

TREATY OF ROME AMENDMENT TO INCLUDE "ENVIRONMENT"

The Treaty of Rome, under which the European Economic Communities are established, is currently being revised. In an important new development, it is proposed to enshrine environmental issues within the Treaty itself.

Among the important changes proposed is a new article which will state that: "Action by the Community relating to the environment should have the following objectives:

- to preserve, protect and improve the quality of the environment;
- to contribute towards protecting human health;
- to ensure a prudent and rational utilisation of natural resources."

Another key article is worded as follows: "Action by the Community relating to the environment shall be based on the principle that preventive action should be taken, that environmental damage should as a priority be rectified at source, and that the polluter should pay. Environmental protection requirements shall be a component of the Community's other policies."

That last sentence is of great importance and should ensure that environmental issues are considered whenever energy, agriculture, transport, or even fiscal policies are being propounded at Community level: it will be a unique requirement.

WWF STATEMENT ON ACID RAIN

The World Wildlife Fund (WWF) International has issued a statement warning that acid rain is destroying decades of conservation investment in National Parks and nature reserves.

The statement, issued to coincide with the start of International Acid Rain Week (21 April 1986) said that damage to nature caused by acid rain is already unacceptably high, but that future effects are potentially enormous. "Beyond any reasonable doubt, forests and freshwaters are seriously and detrimentally affected".

WWF has called on government and agencies to reduce industrial emissions in line with international obligations such as the UN ECE Convention.

Pointing out that air pollution is now reaching Arctic and Antarctic ecosystems, WWF has expressed the fear that as industrialisation proceeds in developing countries acid rain will be spread to vital tropical forests. It issued a strong appeal to industry to ensure that new facilities and technologies deployed in developing countries do not increase the problem.

"Every country, developed or developing, will set its own pollution standards," said Charles de Haes, Director General of WWF, "but in doing so, no responsible government can ignore international obligations or set standards so low that its people have to stand by and see their forests destroyed or their lakes poisoned."

The WWF statement concludes that further research on acid rain is not justified without action to reduce emissions.

The full text of the statement is available from:
Chris Rose, WWF International Campaigns and Publications Officer, World Conservation Centre, 1196, Gland, Switzerland (or the Editor, *Clean Air,* has a copy).

POLLUTION CONTROL IN A PRIVATISED WATER INDUSTRY

The government has announced plans to set up an inspectorate to monitor the pollution control activities of water authorities in England and Wales, once these have been privatised.

The inspectorate will advise the Secretaries of State for the Environment and Wales about the way in which the new Water Service Public Limited Companies (WSPLCs) perform their pollution control and monitoring functions. The idea is to ensure that privatisation, meant to bring about greater efficiency in water supply and sewage services, is matched by higher standards of environmental protection and conservation.

Other water pollution control proposals, developed in the White Paper on privatisation of the water authorities (Cmnd 9734) include:

- stronger safeguards against accidental pollution, including new "water environment protection zones" for key water resources and sensitive areas;
- objectives and standards for river quality to be set up on a statutory basis;
- new powers for Ministers to ensure that the new WSPLCs carry out their environmental protection duties to commons standards;
- completion and simplification of controls on effluent discharges to water;
- wider application of the "polluter pays" principle; and
- protection for direct expenditure on environmental services.

Water quality objectives for all lakes, rivers and streams, will be a new development.

It is clear that an outside inspectorate is required to oversee the work of water authorities, which are themselves the biggest polluters in many rivers because of their sewage treatment work. Whether or not the small inspectorate to be set up in DOE will have sufficient manpower to do the job, and sufficient teeth to ensure that enforcement action is effective, remains to be seen. The proposals have already come in for some criticism, particularly since the inspectorate will not be empowered to deal with the considerable pollution caused by other, industrial and agricultural, dischargers.

NPL RESEARCH ASSOCIATE SCHEME

The National Physical Laboratory (NPL) is the UK's National Standards Laboratory and also carries out research in many technical areas. Many individuals from industry and elsewhere have worked at the NPL for varying periods on collaborative projects. In order to formalise and expand such arrangements, NPL has now introduced a new Research Associate Scheme.

The Scheme is designed to enable scientists and engineers from industry, research associations, higher education establishments and other organisations to work at NPL on projects of mutual benefits to the Laboratory and their employer; thereby making available to industry and others NPL's extensive facilities and expertise. In turn, NPL benefits from the knowledge and skills the Associates bring. Transfer of technology is thus achieved through close co-operation between the parties involved, which, it is hoped, will continue on an informal basis after the Associateship has ended. Suitable training packages are also laid on as an essential part of each Associateship. Where appropriate, Associates are encouraged to work for a higher degree while during their time with NPL.

While NPL's activities in support of national measurement standards, industrial metrology and other key technologies span many fields, the following will be of particular interest to *Clean Air* readers: radiation dosimetry; environmental measurements; corrosion; acoustics and noise; humidity; and spectroscopy.

The Laboratory will be happy to discuss proposals for collaborative research and investigation, informally and without commitment.

For further information, contact: The Deputy Secretary, National Physical Laboratory, Queens Road, Teddington, Middlesex TW11 0LW. Telephone: 01-943 6019; Telex: 262344.

SAFE USE OF PESTICIDES

The Health and Safety Executive has published three new leaflets on the safe use of pesticides. *Training in the use of pesticides* outlines essential knowledge for users and lists organisations providing training courses; *Protective clothing for use with pesticides* stresses that different protection is needed according to the chemicals and operations involved; *Crop spraying* details the precautions required in the form of a reference chart. These leaflets are primarily concerned with the safety of the operator — and indeed the figures for suspected poisoning of agricultural workers have more than trebled from 1984 to 1985.

As far as public protection is concerned, HSE stress that they are always willing to liaise with local authorities to investigate complaints. The Agricultural Inspectorate are responsible for health and safety enforcement at over 300,000 premises through their 150 inspectors working in the field. It seems likely that these inspectors will also take on the enforcement of regulations under the Food and Environment Protection Act, due to be implemented this autumn. If this happens, they will surely be in urgent need of the 12 additional inspectors who *may* (there is some doubt about this) be provided to help shoulder the extra workload.

HSE report that complaints about crop spraying dropped between 1984 and 1985, with a significant reduction in those relating to aerial spraying (from 104 to 49); but they remain uncertain whether this is simply a quirk or whether it reflects a real improvement in the performance of operators. As they say, the public have a tendency not to complain.

All the leaflets plus a free wallchart are available from HSE public enquiry points in Sheffield (0742) 752539, Bootle, 051-951 4381 and London, 01-221 0416/0870, or from the Agricultural Inspectorate.

NEW EXEMPTED FIREPLACES ORDER

A new exemption for five fireplaces (boilers) has been made under the 1956 Clean Air Act.

The Smoke Control Areas (Exempted Fireplaces) Order 1986 (SI 1986, No. 638) exempts from the provisions of Section 11(4) of the Clean Air Act 1956 the following boilers:
The Triancomatic 60 boiler, manufactured by Trianco Redfyre Limited; the Corsair 300HW, 500HW and 750HW boilers, manufactured by Erithglen Limited; and the Worcester Coalstream 17.5 kw underfeed stoker, manufactured by Worcester Engineering Company Limited.

All the exemptions are subject to certain conditions as to installation, maintenance and operation; the order applies in England and Wales only.

INTERDISCIPLINARY ENVIRONMENTAL STUDIES

The Special Advisory Committee in Interdisciplinary Environmental Studies at the University of London has produced a brochure on "Interdisciplinary Environmental Research" which endeavours to draw together details of the on-going research activity in this field within London University.

The brochure is available from: Susan Johnson, Secretary, Special Advisory Committee in Interdisciplinary Environmental Studies, University of London, Senate House, Malet Street, London WC1E 7HU.

RE-CHEM PUBLISHES MONITORING RESULTS

As delegates to the 52nd Clean Air Conference will know, Re-Chem International Limited initiated an environmental monitoring programme in June 1984. Its aim was to allay fears that Re-Chem's operations might be causing harm to the environment.

The monitoring programme was drawn up with the following objectives:

- to keep a regular check on the environment in the immediate vicinity of Re-Chem's Plant;
- to validate independently the regular in-plant monitoring carried out by the operational laboratory;
- to obtain information on PCB in environments within the UK that were far removed from Re-Chem's Plants, so that a comparison could be made;
- to make the data available to the general public so that it could be openly discussed.

Re-Chem are now satisfied that they have fulfilled all four objectives, in the process amassing over 11,000 individual measurements. This information has already been compiled and published in international scientific journals, and also released to the public through District Liaison Groups. Re-Chem's own work has been supplemented by investigations and reports concentrating on specific issues carried out on behalf of the company by independent consultants including Harwell, Lee Newman Research Associates, The Universities of East Anglia and Umea in Sweden, and the Robens Institute at the University of Surrey.

Re-Chem has now published a summary report, *Environmental Monitoring Review* (April 1986), which presents the monitoring work and results in an easily digestible form.

The monitoring results themselves should help to assuage concern felt by people living around Re-Chem's Plants. Although they reveal significant and sometimes wide variations in levels of the various components studied there does not appear to be a directional correlation in the results which could relate them specifically to the Re-Chem Plant sites. Indeed, the Company states that the results show that its incineration activities are not having any effect upon the local environment.

Instead, the study demonstrates clearly the ubiquitous nature of PCB, dioxins and dibenzofurans in the environment generally, which is consistent with observations reported in other parts of the world. Levels around the Re-Chem plants are, the report states, unexceptional. The document points in particular to the levels reported in the Pontypool plant stack emissions.

Results are reported for the following components studied: antimony, arsenic, cadmium, copper, lead, mercury, molybdenum, PCBs, selenium and zinc, as well as dioxins and furans in soil and in stack particulates.

The report is available from: Re-Chem International Limited, Charlston Road, Hardley, Hythe, Southampton SO4 6ZA. Telephone: Southampton (0703) 898915.

NOISE CONTROL — NEW BRITISH STANDARDS

In common with other mechanized construction activities, piling works pose different problems of noise control from those associated with most types of factory based industry. They are mainly carried out in the open and are of temporary duration though often of great disturbance while they last. Noise intensity and character varies greatly at different phases of the work and the sites cannot be excluded by planning control from areas that are sensitive to noise.

BS 5228 *Noise control on construction and open sites* is an important four Part standard which directly affects the building and civil engineering industries. Noise in excess of the Health and Safety Executive's recommended limit for unprotected ears can be a serious hazard to health. Adherence to the provisions of BS 5228 : Part 4 *Code of practice for noise control applicable to piling operations* should overcome problems associated with the need for protection from noise of persons living or working on and in the vicinity of construction and other open sites.

This Part of the standard supplements the information given in BS 5228 : Part 1 *Code of practice for basic information and procedures for noise control* with information especially relevant to piling works. BS 5228 : Part 4 recommends noise control measures which can be adopted to ensure good practice and enable piling to be carried out economically with as little disturbance to the community as is practicable.

Vibration is not covered by this standard but the British Standards Institution has published BS 6472 which covers human response to vibration in structures. A draft proposal for an international standard covering the measurement and evaluation of structural vibration is being evaluated by the International Organization for Standardisation (ISO). A work item dealing with the vibratory loading of structures is also being processed within ISO.

Copies of BS 5228 : Part 4 may be obtained from the Sales Department, British Standards Institution, Linford Wood, Milton Keynes MK14 6LE. Price: £22.00 (£8.80 to BSI subscribing members).

HAZARDOUS INSTALLATIONS

The Health and Safety Executive (HSE) has published the name and addresses of CIMAH sites. Copies of the list are available from HSE Enquiry points in London, Bootle and Sheffield.

The CIMAH (Control of Industrial Major Accident Hazards) Regulations 1984 has been progressively brought into operation since they were laid before Parliament just over a year ago. They implement the EC "Seveso" Directive on the major accident hazards of certain industrial activities involving dangerous substances which have the potential to cause serious danger to people or the environment.

For the sites in the published list, the regulations require:

- submission by the manufacturers to HSE of a written report or "safety case";
- preparation by the manufacturer of an on-site emergency plan;
- preparation by the local authority at county or equivalent level of an off-site emergency plan;
- arrangements by the manufacturer for provision of information to people in the vicinity of the site who might be affected by a major accident.

As a result of the recent abolition of the Greater London Council and the Metropolitan County Council, a change has been made to the definition of "local authority" in the CIMAH Regulations 1984. The off-site emergency plans required under CIMAH for certain industrial installations involving dangerous substances and formerly prepared and kept up to date by the GLC and MCCs, will now be the responsibility of the Fire and Civil Defence Authorities.

Following the publication of HSE's list of CIMAH sites, the Association of Metropolitan Authorities (AMA) called for more information about potentially hazardous sites to be made available, both to the local authorities and the general public.

The AMA fears that thousands of risk sites are not covered by the existing notification requirements — only 370 are listed for the Greater London and six metropolitan conurbations. The AMA further believes that there could well be sites left out from a new, 34,000 strong, list being contemplated by the HSE.

The AMA is establishing a series of local hazards surveys along similar lines to ones already carried out in Redbridge and Coventry. These will take place in Knowsley, Rotherham, St. Helens, Solihull, Suffolk and Walsall. The surveys are inteded to reveal just how many hazardous installations exist in those areas.

The AMA has also issued a Critique of UK controls over hazardous installations, which is available from the AMA, 35 Great Smith Street, London SW1P 3BJ.

GOVERNMENT SUPPORT FOR POLLUTION ABATEMENT TECHNOLOGY FAIR

The Government will be sponsoring a major new international trade fair of pollution abatement equipment next year.

The fair is to be held at the National Exhibition Centre, Birmingham, from 6 - 9 April 1987 to mark the beginning of European Year of the Environment.

The International Pollution Abatement Fair is to be organised by Brintex Ltd., 178-202 Great Portland Street, London W1N 6NH. Tel: 01 637 3400.

WASTE AS FUEL

As delegates to the 1985 Clean Air Conference will know, refuse derived fuel (RDF) has a considerable potential in the UK. The abolition of the Metropolitan counties has perhaps put in question the future of some plant burning waste and producing heat, but RDF pellets are now being considered for a district heating scheme supplying several low rise blocks within the London Borough of Southwark. Trials are being conducted to ensure that the system is technically reliable and that combustion is pollution free. The tests will use "Easiburn" pellets, supplied by East Sussex Enterprises. If the pilot scheme proves satisfactory, LB Southwark plans to build its own RDF manufacturing plant.

Investigation into pollution associated with the large scale use of RDF is being conducted by LB Southwark's Environmental Health Department and the London Scientific Services. They will test in particular emissions of heavy metals, hydrocarbons and acidic gases.

In the United States burning refuse to create energy is seen as part of the answer to the pressing refuse disposal problem. According to a new report published by market researchers, Frost & Sullivan, "Refuse-to-Energy Systems Market", the market for equipment and services associated with refuse-to-energy systems will generate sales of about US$1.3 billion per annum over the next 15 years.

The volume of refuse generated in the US is growing and costs of landfill disposal are also increasing. The value of steam and electricity has risen and the business climate for energy sales has improved. Finally, expertise in plant design, construction and operation is advancing, making refuse-to-energy (RTE) projects far less of a gamble than in the past.

GUIDANCE ON RADIOACTIVE DISCHARGES

Friends of the Earth (FOE) have produced a self-help guide to radioactive discharges in Britain. This aims to dispel confusion surrounding the subject, by allowing the general public to find out various facts for themselves. It covers the following areas:

- the main legislation regulating the Nuclear Industry and its radioactive discharges;
- the institutions involved in the monitoring, regulation and management of discharges;
- the information provided by these institutions for the general public and where to obtain it;
- how to contact those carrying out independent research and monitoring of discharges;
- the criteria for reporting nuclear accidents to the Government (radically changed in July 1982);
- a guide to gathering health statistics in areas which have, or are planned to have, nuclear facilities located nearby.

GOOD NEWS

Smoke Control Progress in York

After a hiccup (due to lack of finance during the period 1980 - 1984) York City Council has restarted its Smoke Control Programme. With luck and a lot of hard work on the part of the York CC this splendid city of 100,000 inhabitants may be smoke free by 1990 after 22 years of progress.

IN PARLIAMENT

9 APRIL 1986 *Written Answers*

Sizewell

Mr. Gareth Wardell asked the Secretary of State for Energy when he expects to announce his decision on the building of a nuclear power station at Sizewell.

Mr. Goodlad: The Sizewell B inquiry inspector has told my right hon. Friend that he hopes to deliver his report in September. My right hon. Friend then intends to reach his decision as soon as he possibly can.

26 MARCH 1986 *Written Answers*

Waste (Fuel Conversion)

Mr. Maclennan asked the Secretary of State for the Environment what discussions he has had with, and what financial assistance he has made available to, local authorities on the conversion of domestic and industrial refuse into fuel.

Mrs. Rumbold: About £3 million has been made available to Tyne and Wear and South Yorkshire metropolitan county councils for the development of their mechanical waste sorting plants producing waste-derived fuel from domestic and trade waste. This has been augmented by funding supplied by my Department under separate research contracts for studies and development work on production of fuel from a range of waste undertaken at the Department of Trade and Industry's Warren Spring Laboratory.

Our officials have held discussions on the conversion of domestic and trade waste into fuel with Humberside CC, Isle of Wight CC, East Sussex CC, West Sussex CC, and Merseyside MCC amongst others. The latter two have also received modest funding for minor studies on mechanical waste sorting.

Discussions have taken place from time to time with various bodies, including local authorities, on the recovery of energy from domestic waste as landfill gas (methane).

15 APRIL 1986 *Written Answers*

Nitrates and Nitrites

Mr. Boyes asked the Secretary of State for the Environment what are the levels of nitrates and nitrites in the water provided for public consumption within each of the Thames water supply districts: whether the levels conform to European Economic Community Directive 80/778; if the authority has applied for any derogations made under article 9 of the European Economic Community Directive 80/778: and if he will make statement.

Mr. John Patten: Nitrate and nitrite levels in all areas supplied by Thames water authority are below the limit specified in EEC Directive 80/778 except in those areas mentioned in the reply I gave on 14 March, at column 620, in respect of nitrite. The maximum nitrite level reached in any of those areas is 0.35 mg/l. Applications for derogations for those areas have been forwarded to the European Commission under article 20 of the directive with a recommendation that they be approved for a two-year period.

18 APRIL 1986 *Written Answers*

Coal-burning Power Stations (Pollution)

Mr. Normanton asked the Secretary of State for the Environment what tonnage of ash was released into the atmosphere by coal-burning power stations of the Central Electricity Generating Board during each of the calendar years 1970 to 1985.

Mrs. Rumbold: Information is not compiled precisely in the form requested, but total grit and dust emissions to the atmosphere in the years in question from coal-burning power stations of the Central Electricity Generating Board have been estimated as follows.

Year	*Mass Emission (Tonnes)*
1970	178,500
1971	161,600
1972	139,200
1973	154,800
1974	130,100
1975	138,100
1976	139,500
1977	133,400
1978	133,400
1979	140,500
1980	135,300
1981	124,900
1982	109,700
1983	108,300
1984	66,400
1985	84,700

30 APRIL 1986 *Written Answers*

Acid Pollution

Mr. Powley asked the Secretary of State for the Environment when he expects to publish the report of his Department's acid waters review group, and if he will make a statement.

Mr. Waldegrave: The interim report by the United Kingdom Acid Waters Review Group is being published today. I have arranged for copies to be placed in the Library.

The group's report assesses the data currently available and sets out the scientific background to the various processes that may contribute to freshwater acidity. Criteria and definitions for identifying acidific waters are recommended and methods and guidelines for monitoring freshwaters are reviewed.

The report notes that acidification has been identified in some distinct geological regions of the north of England, south-west Scotland and Wales, but that there is no evidence of widespread acidification of United Kingdom freshwaters generally. It discusses the decline of salmon and trout fisheries in some parts of Scotland and Wales, and suggests that the importance of land use practices for fisheries may be indicated by the tendency for poor fishery status to correlate with afforested catchment areas, although a causal relationship between afforestation and fishery decline has not been established.

The report notes that available data on the chemical and biological status of freshwaters were mostly obtained for purposes other than the assessment of freshwater acidification and are not generally of the quality required to produce the clear picture of historical trends which is needed to establish whether links exist between freshwater acidification and acid rain or other factors such as soil chemistry or land use practices. Of the 75 sets of acidity data examined only six appear to give firm evidence of increasing acidity.

I have decided that we need a better picture of freshwater acidification and am taking steps to extend monitoring work in order to improve our understanding. Work already in progress under my Department's research programme on the analysis of diatom remains in sediment cores will also be extended to surface waters in other regions identified in the report as susceptible to acidification.

The group's final report, due in late 1987 or early 1988, will draw on the results of current research and monitoring and aim to assess both the probable causes of freshwater acidification and the possibilities for remedial measures.

Mr. Chris Smith asked the Secretary of State for the Environment what systematic monitoring for acid pollution is carried out in rivers in England.

Mrs. Rumbold: The water authorities routinely monitor the acidity of rivers as part of their general responsibility for water quality monitoring. Specific monitoring of acidity is carried out in certain areas of the United Kingdom which may be susceptible to surface water acidification. In England, continuous measurements of acidity are made on the Rivers Esk and Duddon as part of a joint project between my Department and the North West water authority. My Department is also funding the study being carried out by the river purification boards into the effects of acid deposition on Scottish catchments, and co-funding the study of catchment systems feeding the Llyn Brianne reservoir, which is being carried out jointly with the Welsh water authority, the Natural Environment Research Council and the University College of North Wales, Bangor.

Mr. Chris Smith asked the Secretary of State for the Environment if salmon and trout found dead on river banks are tested for signs of poisoning related to surface water acidification, and if he will make a statement.

Mrs. Rumbold: No. There is strong circumstantial evidence that short-lived pulses of high acidity associated with snow melt or the on-set of rain following a dry period have caused occasional fish kills in rivers, but fish killed in these circumstances show no distinctive signs and there is no test to distinguish them from those which have died naturally. Fish living in chronically acidified waters — generally lakes — may show observable signs of gill-clogging or skeletal deformity, but these symptons may not be indicative of acidification damage only.

1 MAY 1986 *Written Answers*

Acid Pollution

Mr. Chris Smith asked the Secretary of State for Wales what systematic monitoring for acid pollution is carried out in rivers in Wales.

Mr. Wyn Roberts: The Welsh water authority regularly checks the level of acidity in river waters as part of the national harmonised monitoring scheme and in its assessment of river water quality. The Department is jointly funding with the Department of the Environment the study of acidification being jointly carried out by the Welsh water authority, the Natural Environment Research Council, the Forestry Commission and the university colleges of Wales, in the catchment areas feeding the Llyn Brianne reservoir.

SCOTLAND

Acid Pollution

Mr. Chris Smith asked the Secretary of State for Scotland what systematic monitoring for acid pollution is carried out in rivers in Scotland.

Mr. Ancram: The control of river quality in Scotland rests with the river purification authorities (river purification boards and islands councils). They routinely monitor the quality, including acidity, of the rivers within their areas. In recent years a number of site-specific monitoring exercises have been established by individual authorities to assess the effects of acid deposition. In addition, the Government have recently commissioned the river purification boards to carry out jointly a systematic three-year study into the effects of acid deposition on a total of 150 catchments in Scotland.

22 APRIL 1986 *Written Answers*

EC (Environmental Assessment Directive)

Mr. Michael Brown asked the Secretary of State for the Environment if he will make a statement on the implementation of the European Communitites environmental assessment directive.

Mr. Waldegrave: I have today published, and placed in the Library, a consultation paper which sets out proposals for implementing the European directive on environmental assessment. They would apply to developments which are subject to planning procedures. The arrangements proposed will ensure that, for projects of major potential impact, comprehensive environmental data will be provided by the developer with the assistance of other bodies as necessary. Experience of the use of environmental assessment procedures has shown that they can help to resolve environmental problems at an early stage and avoid unnecessary delay and frustration when the planning application has been submitted.

The proposals are based on advice from a working party which included representatives of industry, local authorities and environmental groups. It was the unanimous view of the working party that the requirements of the directive could be met within the framework of the existing land use planning system. My right hon. and learned Friend, the Secretary of State for Scotland, and my right hon. Friend, the Secretary of State for Wales, are publishing consultation papers making similar proposals for Scotland and Wales which are also being placed in the Library.

(All 'In Parliament' items were first published in *Hansard*.)

We cannot (lack of space) publish all relevant Parliamentary Questions. Further details are available from the Editor, and the monthly Green Alliance Parliamentary Newsletter *(tel. 01 836 0341) provides excellent coverage of environmental matters in Parliament.*

INDUSTRIAL NEWS

Ford expands exhaust emission test facility

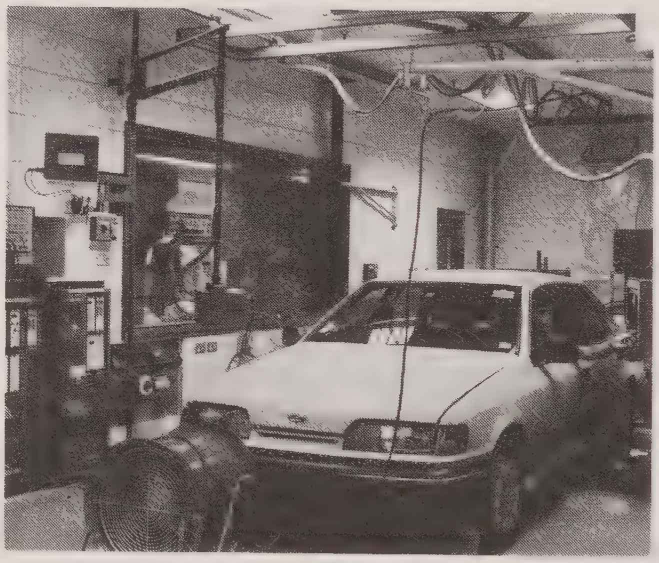
A £6.5 million extension to the Ford vehicle emission laboratory was opened at Dunton, Essex, by Environment Minister William Waldegrave in March 1986. As a result of this investment the laboratory's capacity is increased by fifty per cent, while the content and precision of its tests are also significantly improved.

The laboratory is responsible for exhaust emission research and all certification testing for Ford cars and commercial vehicles built in Europe. It will be capable of testing vehicles not only against the emission legislation currently in place but also that planned for enactment in Europe, USA and Japan into the 1990s.

The expanded laboratory now contains one of the largest assemblies of equipment and is the most modern facility of its kind in the European motor industry. An increase in floor area from 22,500 sq feet to 41,000 sq feet houses four additional vehicle emission test cells, bringing the total capacity to 11 test cells, with increased garage and support facilities.

Latest Computer Technology

Each test cell is equipped with the latest variable load electric chassis dynamometers and extensive exhaust gas analysis equipment. The test systems are fully automated, using the most recent computer and printer technologies, to ensure close control of procedures and accurate simultaneous analysis of the emission levels at all points in the exhaust systems. Provision has been made for measurements of emission levels on vehicles using any known catalyst or "lean burn" emission control method.



Support facilities include a new temperature "soak" area in which vehicles can be acclimatised prior to testing and a new Sealed Housing for Evaporative Determination ("SHED") which measures hydrocarbons emitted by the vehicle when stationary. There is also a high volume fan, which can simulate wind speeds up to 75 mph, allowing laboratory measurements of fuel economy and emissions at higher speeds.

The entire testing area has now been air-conditioned to give close control of the laboratory environment and to reduce the variability of results, so allowing more precise evaluation of development changes on the vehicles.

Updated Atmospheric Test Cell

An important facility in this laboratory is the atmospheric test cell, built in 1984 but now updated to the latest "catalyst" test level, in which altitude simulations up to 7500 feet, temperatures to 86°F and humidities to 75 per cent RH (Relative Humidity) can be achieved. This enables Ford engineers to investigate the influence of ambient conditions on exhaust emissions.
Reader Enquiry Service No. **8619**

Energy savings from cleaner air

Metal Box Engineering's Westhoughton (Lancashire) business has recently secured orders for energy-efficient air pollution control systems from DRG Kwikseal, of the UK, and Corner Corporation of Taiwan. Metal Box has a licence from Smith Environmental Corporation of Duarte, California, one of the USA's leading suppliers of air pollution control and heat recovery systems.

Both systems are based on thermal oxidisers, which remove solvents entrained in the exhausts from industrial processes by heating the air to approximately 750°C, at which temperature most solvents are effectively destroyed. This is partly carried out using the heat generated by the exothermic destruction of the solvents and partly by added fuel. The heat generated by the oxidiser can then be used to run the process from which the exhaust comes. When this is done, the calorific value of the solvents is used to supplement the fuel used for the process, giving considerable cost savings.

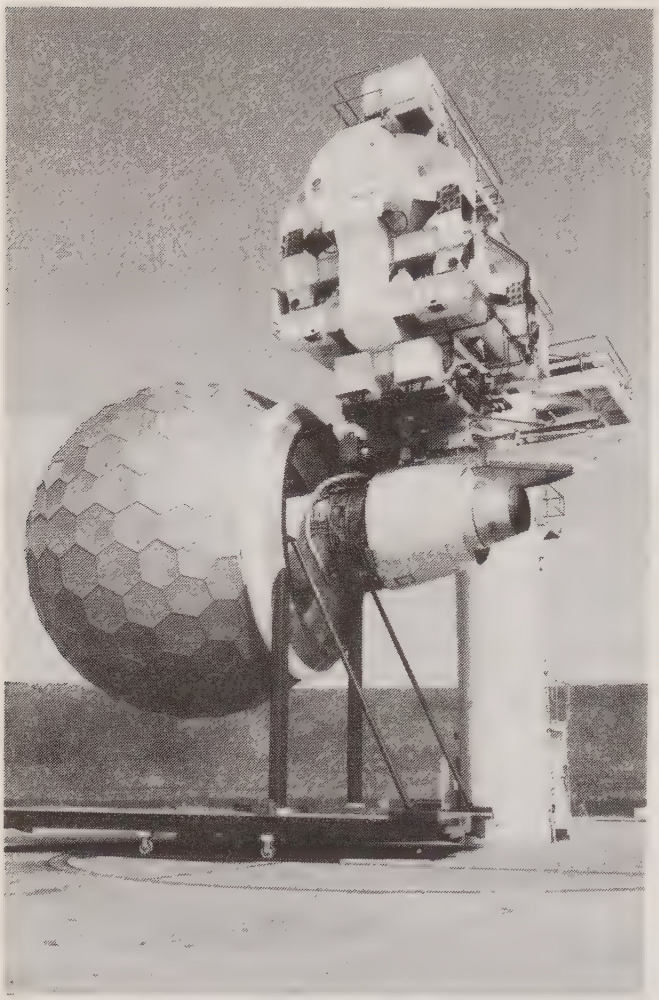
DRG Kwikseal are major manufacturers of draft proofing and sealing strip and the contract involves the use of a thermal oil system to return heat to the process, in this case a series of web ovens used in a paper converting operation.

The Corner Corporation is one of the larger can makers in Taiwan. This contract is a fully integrated system, in which clean air from the output side of the thermal oxidiser is recirculated directly back into the process, in this case a sheet lacquering operation. As with the DRG Kwikseal contract, a primary air/air heat exchanger is used to reduce the fuel cost of the process.
Reader Enquiry Service No. **8620**

Rolls-Royce win Pollution Abatement Technology Award

Among the winners of the Pollution Abatement Technology Award 1985 was Rolls-Royce Limited, who designed the RB211-535E4 turbo fan engine for the Boeing 757 aircraft. The design involved a highly successful balancing act to ensure that gains in the control of noise and emissions and in fuel efficiency did not hurt the engine's performance in other critical areas. The turbofan aero-engine has made the Boeing 757 the quietest major transport aircraft in service. With the 535E4 variant, the B757 is the only major aircraft allowed to fly in and out of Washington National Airport at night. In service, the engine uses approximately 40% less fuel than the previous generation aircraft, and in terms of emissions, it is 50 times cleaner than earlier types.

The turbofan has an inherently low exhaust noise output because 80 per cent of the flow is low velocity by-pass air. So



Rolls-Royce had to turn to the interior of the engine in their search for further noise reductions. They built major new facilities to study internal noise sources such as the fan, the compressor, combustor and turbine units. Results of this research were built into marks of the RB211 engine which produced the quiet Lockheed TriStar and the quietest versions of the Boeing 747. Since then, the standard of noise-absorbing material has been substantially improved. Tone control techniques embodied in the wide-chord fan have made the engine almost toneless and similar technology has been used in the design of turbine. The new integrated nozzle assembly produces a lower exhaust velocity — hence lower noise output — than with the normal independent fan and hot gas nozzles. Work has also been done on bleed valves which generate noise when they unload the compressor system during low power operations. Altogether, these improvements have produced an engine which is some 20 EPNdB quieter than earlier engines, which themselves had only one third of the thrust of the 535.

Emission control was directed in particular to restricting emissions of carbon and unburnt fuel produced by incomplete combustion during taxi-ing, take-off and approach. In the 535, design of areas of the combustion chamber, the primary burning sector near the fuel injector and the cooling zones around the wall have greatly reduced the amount of pollutant generated.

The Pollution Abatement Technology Award Scheme is sponsored by the Environment Foundation and promoted by the CBI, DOE, and the Royal Society of Arts. Other winners of the 1985 awards were: Castrol Limited, for Biolube 100, a biodegradable oil for outboard motors; ICI Paints Division, for a water-based low solvent emission paint and protective system for vehicles; and Biocides Group, the Boots Company plc, for safe control of microbial fouling. The **Seven Trent Water Authority** and **BKW Sales and Services Ltd.** won their award for continuous soil injection of sewage sludge and agricultural slurry. The process enables much greater volumes of sludge to be disposed of, rather than dumped into coastal waters, by a system of underground injection. This helps to overcome the odour problem associated with traditional disposal methods so that disposal can now be considered on agricultural land close to urban areas. The process consists of a number of readily available pieces of equipment but put together as an effective, commercially viable answer to one of Britain's perennial waste disposal problems.

The award to **ICI Paints Division** is also of interest. Organic solvents, used in large quantities for paintwork and protective coating by the motor industry, are coming under increasing scrutiny and control. ICI Paints have developed new paint and paint protection technologies which offer dramatically reduced solvent usage. They have produced more effective waterborne paints using aqueous microgels. The unique paint structure which results mean that it will not run or sag as humidity changes in the factory. Overall, the new "Aquabase" cuts solvent emissions by 60% compared with previous technology.

Full details of the Pollution Abatement Technology Awards 1985 and the Award Scheme for 1986 are available from: Royal Society of Arts, John Adam Street, Adelphi, London WC2N 8EZ. Telephone: 01-930 5115.

Rapid growth forecast in fuel-cell power

Fuel-cells with platinum catalysts are being tested in United States and Japan. Their advantages include quiet, pollution-free operation, and energy conservation.

It is estimated that by the year 2000 13% of Japan's electricity needs, amounting to 25,000 megawatts, will be generated directly by the chemical combination of hydrogen and oxygen in fuel cells. In the United States 6,000 megawatts of fuel-cell capacity is expected to be installed by the year 2003, and 14,000 megawatts by 2008.

The Phosphoric Acid Fuel Cell (PAFC) is the most highly developed type now available. It employs a phosphoric-acid electrolyte with a platinum catalyst. Research into the employment of platinum as a catalyst for PAFCs is being carried out at the Johnson Matthey Technology Centre in Sonning, Berkshire. Within 15 years these catalysts are expected to represent the largest use of platinum outside the automobile industry.

Besides generating electricity, certain PAFCs can supply space heating for buildings such as hospitals, hotels and swimming pools and process-heating for industry.

Fuel into power

Fuel cells convert fuel directly into power — unlike conventional fossil-fuel power stations in which as much as 70% of the fuel consumed can be rejected as heat. In the fuel-cell process oxygen from the air is combined with the gaseous fuel, usually hydrogen derived from natural gas, liquid hydrocarbons (or, in the future, coal).

The only by-product of this electrocatalytic reaction is water, so that the fuel cell avoids environmental problems such as the disposal of radioactive waste products from nuclear plant, and the production of sulphur and nitrogen oxides at coal-fired power stations.
Reader Enquiry Service No. **8621**

These are **profitable times for pollution control,** according to a new book *Pollution Control (4th Edition),* published by ICC Business Ratios (28-42 Banner Street, London EC1Y 8QE, 01-253 3906).

STATIC MIXING UNITS AID ENVIRONMENTAL PROTECTION

by **Heinz Rudhard** and **Willy Tauscher**

Synopsis

As a basic process, static mixing dates back to the 1950s. Manmade fibre producers were looking for a mixing device to bring about homogeneous composition and temperature in a continuously flowing ploymer melt, as is essential if high-quality fibres are to be spun. With the dynamic mixers then available product homogeneity could not be achieved satisfactorily. Finally, the desired effect was obtained with devices lacking any moving parts that divide the product stream into a large number of sub-streams which are continuously transposed and reunited. Now, this technique has a far wider range of applications, in flue gas detoxification, exhaust gas purification, sewage and drinking water treatment — to name but a few.

Mixing without moving parts

Industrial spraying of epoxy resins had revealed that to avoid contamination the components ought to be mixed only in the gun, immediately prior to spraying. Static mixing units are ideal for this, provided the reaction times are not too short. Incidentally, the mode of operation of such mixers may be demonstrated particularly well in this application, by allowing the product to cure in the mixer and then making sectional cuts *(Fig. 1)*. In the SMX mixer, the two components to be mixed are repeatedly broken up into layers by the bars and spread out over the pipe cross-section. The number of layers formed grows exponentially with commensurately increasing homogeneity.

When studying the flow patterns in distillation columns with Sulzer structured packings, we discovered that these internals have an unexpectedly strong mixing effect. This revelation triggered off the development of the static mixing units, which subsequently found wide use in various branches of industry, such as petroleum, natural gas, petrochemicals, chemicals, plastics production and processing, cosmetics and detergents, food processing, water treatment, energy etc.

Moreover, mixer applications were not confined to viscous fluids, but have been extended to low-viscosity liquids and even gases. The latter flow turbulently, but the turbulence is not sufficient to ensure homogeneous mixing in a short length of empty pipe. Even for the turbulent mixing of components without differing densities, an empty pipe must be some 100 diameters long. An SMV mixer, on the other hand, achieves the desired mixing within a very short distance. The mixing elements consist of corrugated plates, arrayed to form open, intersecting channels *(Fig. 2)*.

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Dr. Willy Tauscher, Sulzer Brothers Limited, VK/0634-Mischverfahren, CH-8401 Winterthur, Switzerland.

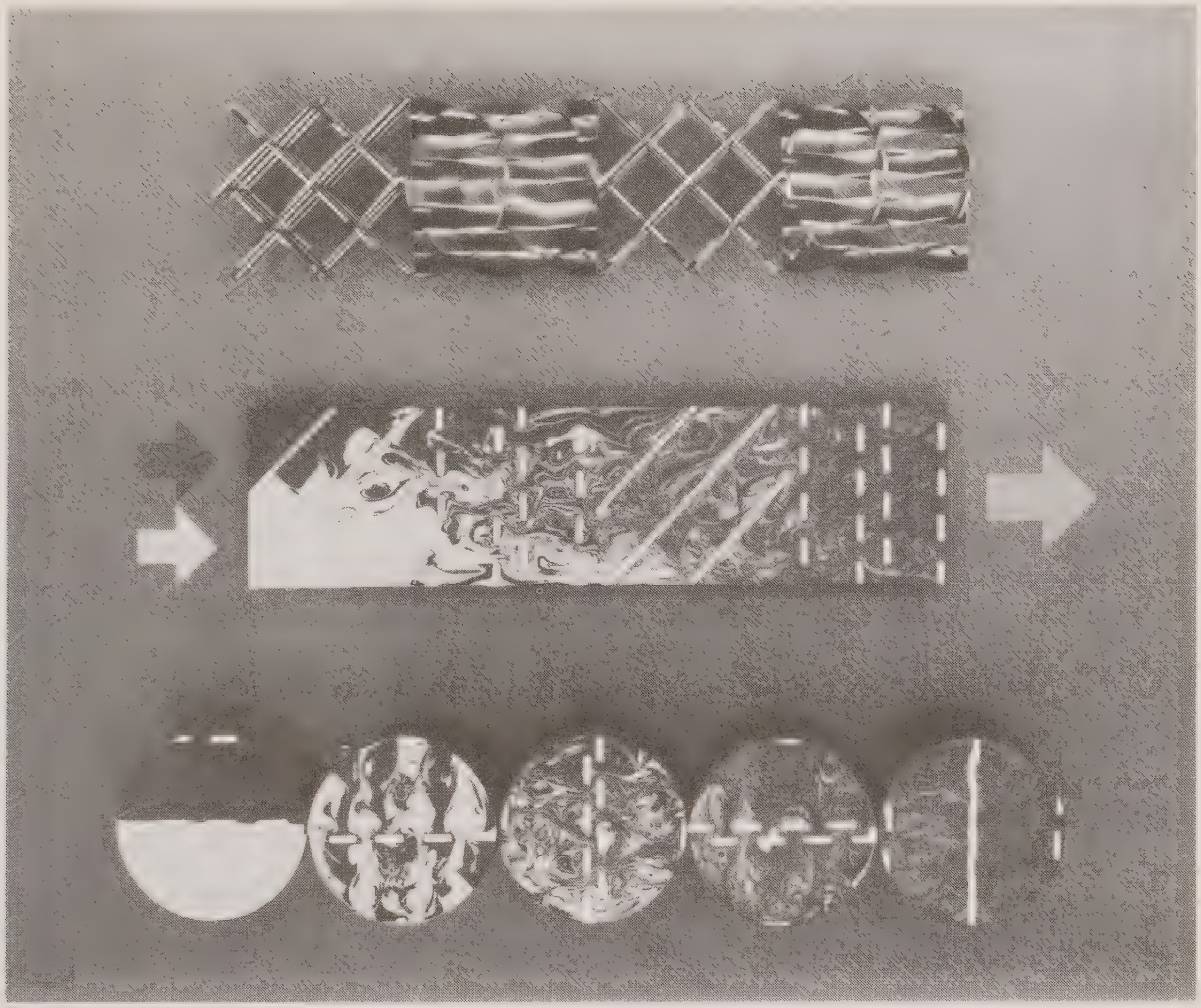

Fig. 1
Blending two epoxy resins in an SMX mixer. This mixer is used to mix viscous fluids.

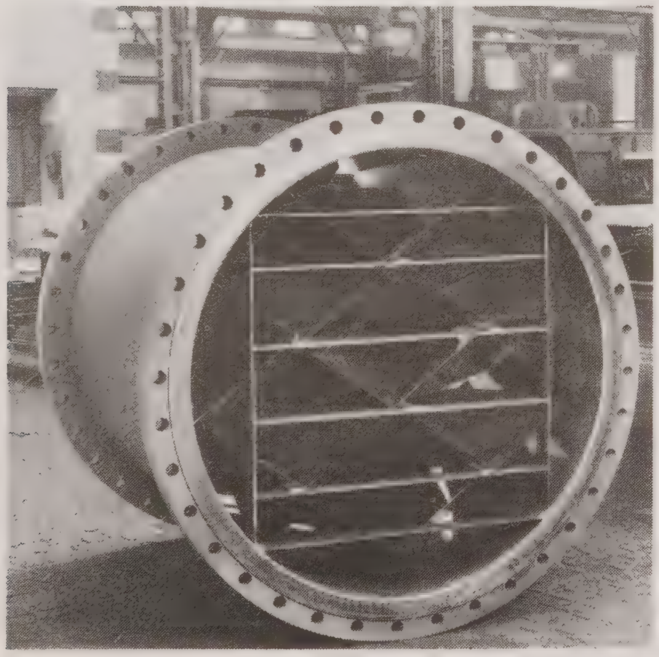

Fig. 2
Sulzer SMV mixer NPS 1400 mm. The mixing elements consist of corrugated plates.

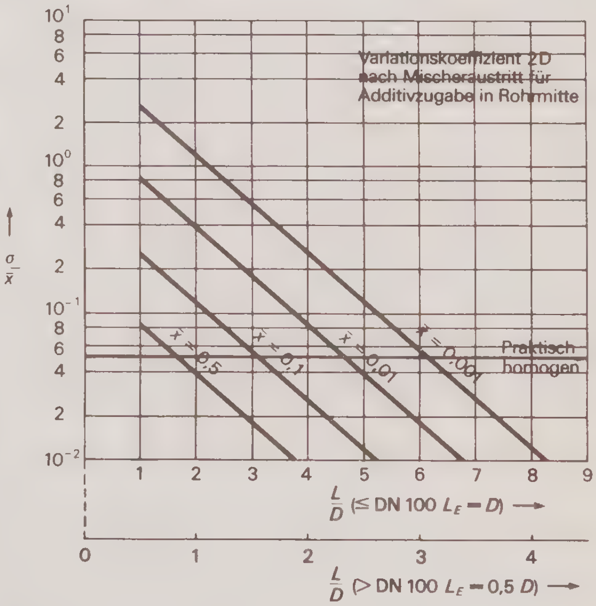

Fig. 3
Variation coefficient $\sigma/\overline{x}$ of the SMV mixer versus relative mixer length L/D for turbulent flow ($\overline{x}$ = volume flow rate ratio $v_1/(v_1 + v_2)$, L_E = length of mixing element).

Mixing performance

When specifying static mixing units, the mixing performance must be assessed with reference to some yardstick. The result of a mixing operation may be quantified by ascertaining the state of a mixture with locally measured variables like temperature, concentration, electrical conductivity etc. and presenting it by statistical criteria. The standard deviation σ characterizes the random variation of all n measured values x_i from the arithmetical mean $\bar{x}$. The standard deviation is expressed by the equation:

$$\sigma = \sqrt{\frac{\sum_{i=1}^{n} (x_i - \bar{x})^2}{n-1}} \qquad (1)$$

In practice a certain standard deviation from the mean is specified for the final state of a mixture. Accordingly the degree of homogeneity in a mixture is conveniently defined with the variation coefficient $\sigma/\bar{x}$. The smaller the quotient is, the more homogeneous the mixture.

The correlation between the variation coefficient and the relative mixer length (expressed as the quotient of mixer length L and inside pipe diameter D) is obtained by measuring the mixing quality for various mixer lengths. *Figure 3* shows this relationship in the turbulent flow range for the SMV mixer.

The mixer length needed to assure a particular mixing quality can be obtained from this diagram. It will be seen that the homogeneity of the mixture increases exponentially with the mixer length. In addition, the influence of the volume flow ratio of the components is also quite apparent. The mixing effect is not random, but a systematic geometric process. As a consequence the static mixing unit consumes very little energy, as is reflected in the small pressure drop. This is accommodated by suitable sizing of the pump or blower. The pressure drop Δp can be calculated with the following equation:

$$\Delta p = Ne \cdot p \cdot v^2 \cdot \frac{L}{D} \qquad (2)$$

Here Ne is the Newton number, p the density and v the velocity of the flow medium. For the SMV mixer $Ne \approx 1$ to 2 depending on the mixer geometry.

Flue gas desulphurisation and denitrification

Many old plants and all new coal-burning power stations in many industrial countries must now be equipped with special flue gas purification equipment. For existing stations preference is given to wet chemical desulphurisation. For example, milk of lime is used as a scrubbing medium to remove SO_2 from the flue gas stream. Scrubbing flue gas in this way always results in cooling and saturation of the flue gas with moisture.

Nowadays, nearly all these desulphurising processes for power station exhaust gases entail heating the scrubbed flue gases over the shortest possible distance, usually in ducts of very large cross-section, by admixing a hot gas stream. Reasons for this are:

- the flue gases must reach the downstream heat exchanger only in the dry state,
- condensation and attendant corrosion must be avoided on ducts and stack,
- a certain temperature level must be maintained at the stack entry.

For such a duty, the static mixing unit provides the ideal solution. Sulzer has therefore developed a gas mixer from the standard SMV mixer which is specially adapted to flue gas desulphurisation plants.

Very large volume flows are involved in flue gas desulphurisation plants. Low pressure drop in ducts and internals is therefore important, as it governs to a great extent the energy demand of the blowers. Accordingly, efforts were made to match the feed system and the SMV mixer so that the stipulated mixing efficiency is achieved with minimum pressure drop.

In flue gas denitrification, the nitrogen oxides (NO_x) are reduced with ammonia (NH_3) to nitrogen (N_2) and water. Since the amount of gaseous NH_3 added to the hot flue gas is comparatively small, special attention must be given to efficient mixing before the catalyst bed in order to ensure an optimal reaction.

Exhaust gas purification with static mixing units

Wet process

By virtue of their specific properties, static mixing units are able to perform various duties in the wide area of exhaust gas purification. Removal of dust, eg after dryers, or noxious chemicals like hydrogen chloride (HCl), hydrogen sulphide (H_2S), chlorine (Cl_2), SO_2 etc. from the exhaust air of industrial plants is usually accomplished by gas scrubbing using a suitable scrubbing liquor. Generally large gas loads must be handled, and intimate contact must be assured between the substance to be removed and the scrubbing liquor. For such duties, a cocurrent gas scrubber has been developed, the heart of which comprises static mixing elements. This scrubber, shown schematically in *Figure 4*, consists in its standard form essentially of a scrubbing section with in-built mixing elements and scrubbing liquor distribution nozzle, a sump and mist eliminator. The scrubbing liquor is circulated with a pump and must be renewed either continuously or batchwise. The design of this cocurrent gas scrubber yields the following fundamental advantages:

- small overall dimensions due to high gas velocity (up to 20 m/s possible);
- low energy demand thanks to low pressure drop (0.5 kWh/1000 m^3 gas);
- low scrubbing liquor demand (0.2—1 litre/m^3 gas) thanks to the large interfacial area set up in the mixer;
- high flexibility with respect to fluctuating gas loads;
- unsusceptible to clogging, hence little maintenance;
- low operating costs.

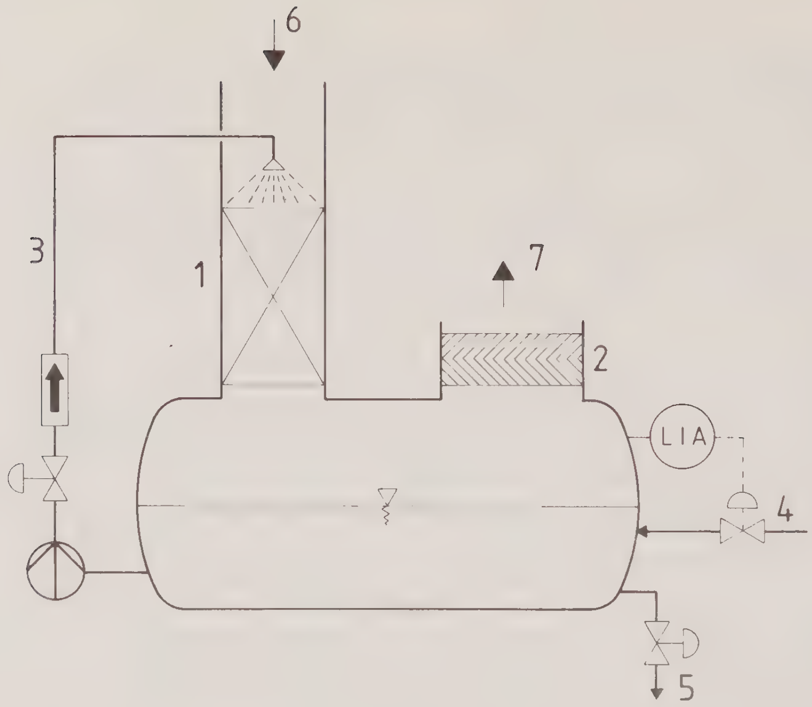

Fig. 4 Schematic of cocurrent gas scrubber. 1 Scrubbing section with scrubbing liquor distribution nozzle and mixing elements. 2 Mist eliminator. 3 Scrubbing liquor recirculation line. 4 Fresh scrubbing liquor feed. 5 Spent scrubbing liquor outflow. 6 Raw gas. 7 Purified gas.

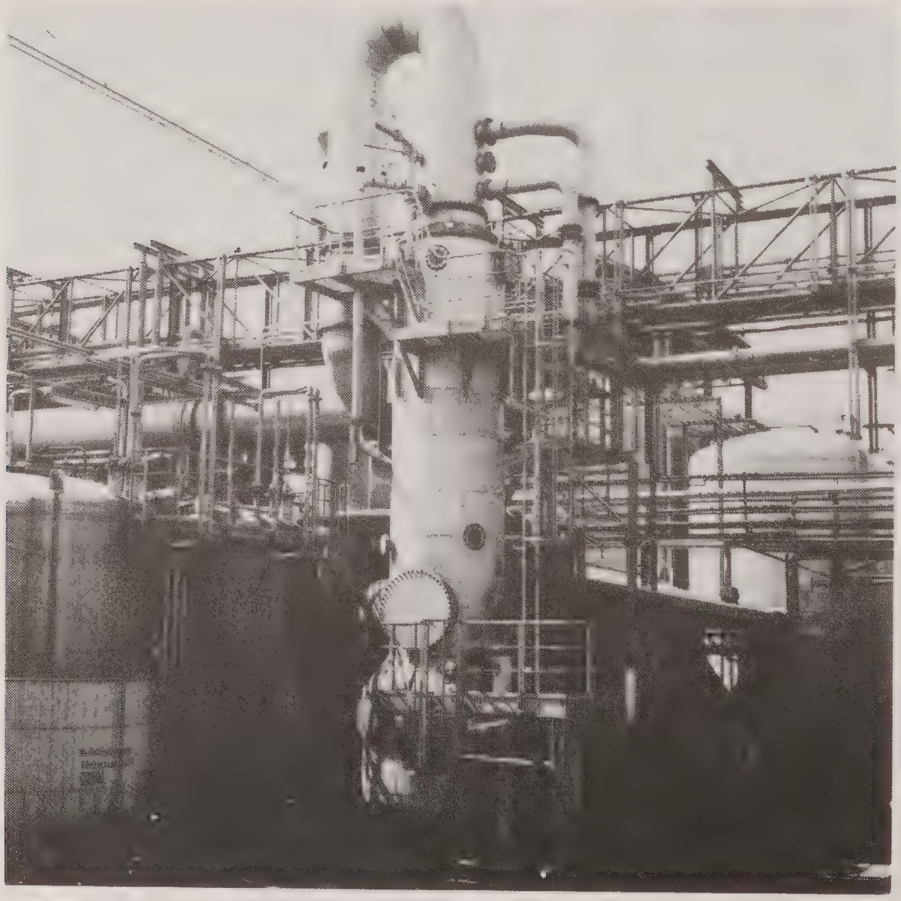

Fig. 5 Plant for absorbing hydrogen sulphide with a cocurrent gas scrubber (Engineering and construction of the complete plant — Hürner, Frankfurt).

Figure 5 shows a compact cocurrent gas scrubber for extremely confined spaces, with the mist eliminator installed in the sump. In many processes gases are scrubbed in-line, without separating the scrubbing liquor from the gas immediately after the mixing section. Here, too, suitable designs can be offered where the wide range of operation and installation possibilities of static mixing units can be utilized.

Dry process

Wet scrubbers for exhaust gas purification have also given satisfactory service in incineration plants for chemical wastes or special refuse, but their use is problematical for domestic refuse incineration, where trouble is experienced above all from the noxious vapours hydrogen chloride (HCl) and hydrogen fluoride (HF). The reacted scrubbing liquor is usually very acid, calling for corrosion-proof materials in equipment and pipework. Moreover, this liquor, now laden with noxious substances, must be given special treatment before it can be released to the environment or sewage treatment plant.

Static mixing units — as main components of dry purification plants — help to avoid these disadvantages. Very encouraging results have been recorded for HCl and HF removal in a metallurgical melting plant, which can be exploited for purifying flue gases from refuse incineration plants. Several aluminium melting furnaces discharge some 50,000 Nm^3/h exhaust gases, with maximum gaseous chloride (HCl) loads of 730 mg/Nm^3 and gaseous fluorides (HF) amounting to 18 mg/Nm^3. White lime ($Ca(OH)_2$) powder is blown into the raw gas stream as adsorbent in front of the NPS 2400 mm diameter mixer *(Fig. 6)*. The mixer ensures uniform distribution of the solid adsorbent in the raw gas and hence uniform and fast adsorption of the noxious substances onto the white lime. Measurements after the cloth tube filter have revealed levels well below the statutory limits.

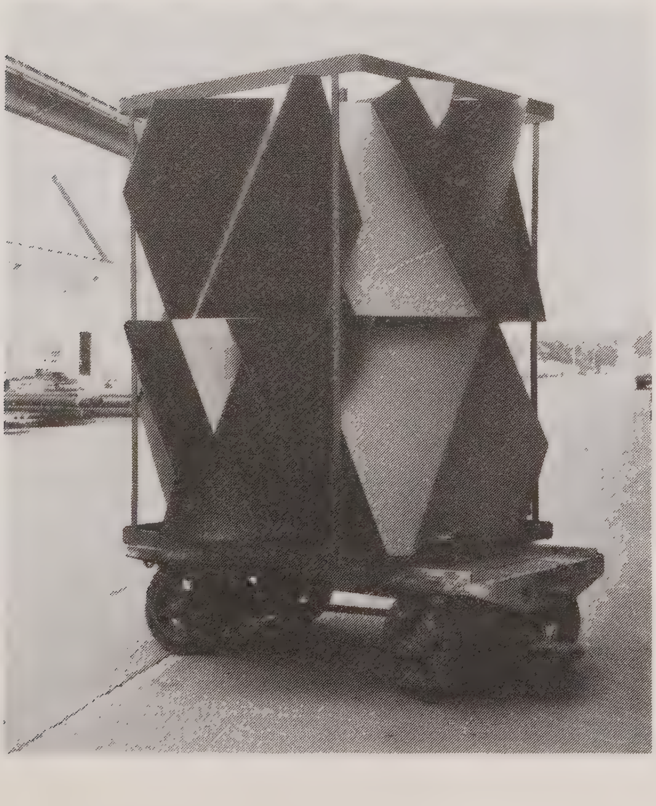

Fig. 6
Static mixing unit SMV with NPS 2400 mm for dry exhaust gas purification in a metallurgical melting plant.

Oil burns better with water

The combustion values of fuel oil can be improved substantially by dispersing water into it. In the boiler the water droplets evaporate explosively, providing additional fuel atomization. The resulting very fine oil mist then offers the combustion air a bigger working surface, leading to better fuel exploitation. By adding 6 to 8% water to the fuel oil in this way, it is possible to raise boiler efficiency some 2%.

To obtain this effect the water must be distributed as uniformly as possible in the fuel oil. To obtain fine dispersions, dynamic mixers were previously employed — so-called homogenizers. However, these have trouble-prone moving parts. To overcome this difficulty increasing use is being made of static mixing units. The SMV mixer is particularly ideal, as it sets up fine droplets within a narrow size range.

Thus in this application static mixing units are contributing towards a cleaner environment in several ways, as:

- better fuel utilization means less soot;
- lower combustion temperature and reduced combustion air demand mean less formation of corrosive sulphur trioxide (SO_3);
- formation of nitrogen oxides (NO_x) is also reduced owing to the lower combustion temperature (though this requires water additions in excess of 10%).

As NO_x emissions are receiving more attention these days, tests on a large Sulzer diesel engine might also be of interest. An emulsion of 20% water in heavy fuel oil reduced NO_x by about 10%, with a measurable fuel saving as well.

More effective waste-water treatment

Like exhaust air purification, static mixing units offer a variety of possibilities in waste-water treatment. A typical duty is neutralizing an effluent or adjusting a certain pH. Depending on the origin of the effluent and its further use, a certain quantity of acid or lye must be mixed into it. On the one hand the desired mixture must be attained by dimensioning the mixer as exactly as possible. On the other hand widely differing volume flows must be mixed, calling for a very efficient mixer. Plastic mixers (polypropylene, PVDF, PTFE) are often employed here *(Fig. 7).*

A possible consequence of effluent neutralisation, especially in metalworking plants, is that various metal hydroxides may form fine sludges which can barely be separated from water by mechanical means. To modify these sludges for settling, chemical flocculants are usually added to the fibre-free effluent. This may be done by the process shown in *Figure 8.* In the mixer (4) a flocculant (metal salt) is added to the effluent. Depending on the duty a flocculation aid (polyelectrolyte) is used in addition. It is stirred with water in a vessel to give a stock solution. This 0.1 to 1% solution must then be diluted with fresh water in a mixer (5) to yield the working solution. Mixing the high-

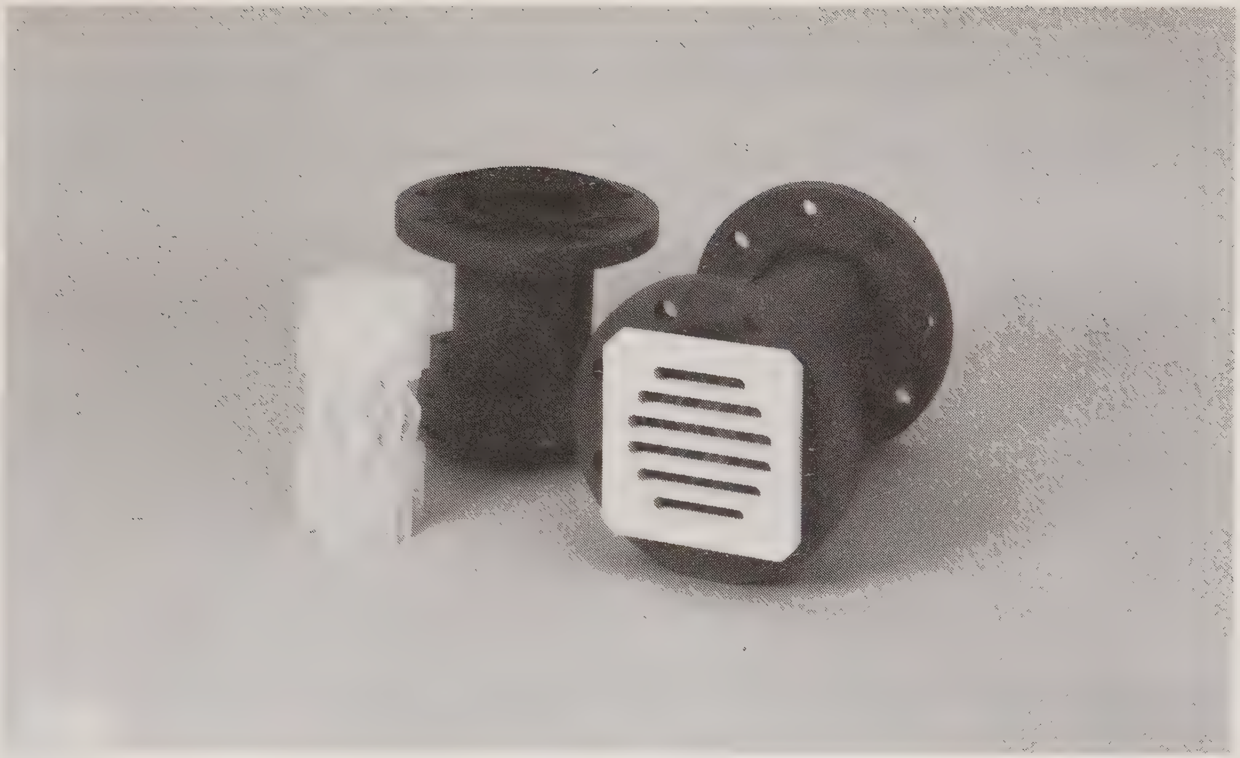

Fig. 7 Sulzer SMV mixer NPS 100 mm in PVDF for effluent treatment.

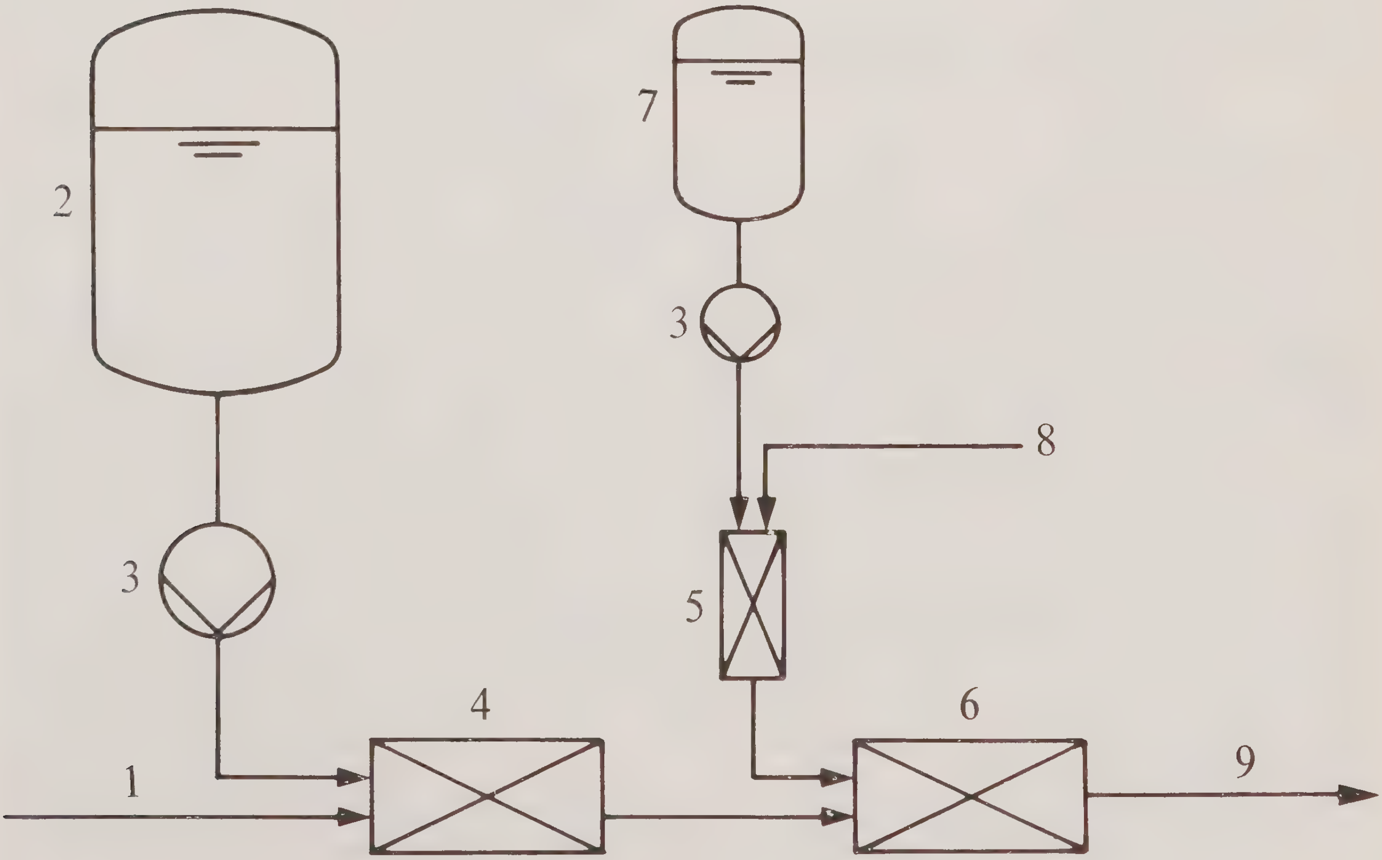

Fig. 8 Admixing various flocculants to waste water. 1 Waste water. 2 Flocculant, such as $FeCl_3$, $Al_2(SO_4)_3$. 3 Metering pump. 4 Sulzer SMV mixer. 5 Sulzer SMV mixer. 6 Sulzer SMV mixer. 7 Flocculation aid stock solution. 8 Fresh water. 9 To filter or flocculation tank.

viscosity polyelectrolyte with the low-viscosity fresh water is a difficult task. The shear forces needed for this are provided in elegant fashion by particularly small mixing element channels. The polyelectrolyte diluted in this way is then mixed with the effluent in the next mixer (6). In addition to the significant saving on flocculants, the excellent mixing of the components promotes strong precipitation of the metal hydroxides.

Drinking water treatment

Care of the groundwater reservoir is becoming increasingly important in securing clean drinking water supplies. Industrial countries can no longer afford to accept contamination of groundwater with resignation and turn to the next drinking water source. Recently a process was tested for obtaining drinking water from groundwater contaminated with mineral oil products. This is a new process where the actual water purification is performed not in a large surface, factory-like installation, but in the ground. The technology was evolved by the Engler-Bunte Institute of the University of Karlsruhe, and tested in a Karlsruhe municipal waterworks. This suffers from its proximity to a railway marshalling yard, where rain washes oil contamination from tank wagons. The oil seeps into the soil with the rainwater, and thence into the groundwater.

In a small surface plant ozone (O_3) is added to the groundwater contaminated with mineral oil. Rapid and fine distribution of the O_3/air mixture from an ozone generator in the water is important here. This is made possible by using SMV mixer, which sets up an extremely fine bubble bed and with it a large interfacial area promoting mass transfer.

Good ozone distribution in the water leads to complete oxidation of the contaminants. The ozone-treated water is then led back into the subsoil via three percolation wells. There it activates microorganisms, which decompose the contaminants during the course of 30 to 40 days' residence.

Latest measurements have shown that water treated in this way forms a barrier in the subsoil by raising the groundwater level, preventing further intrusion of the contaminated water towards the wells.

Conclusions

In this article it has been possible to quote only a few examples showing the need for static mixing units in environmental protection. These mixers owe their acceptance to advantages such as outstanding mixing effect, low energy and space requirements, and absolutely minimal wear and maintenance.

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CLEAN AIR

THE JOURNAL OF THE NATIONAL SOCIETY FOR CLEAN AIR

Vol. 16, No. 3 ISSN 0300-5743 1986

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CLEAN AIR is printed and published quarterly (1986) by the National Society for Clean Air at 136 North Street, Brighton BN1 1RG. Tel: Brighton (0273) 26313.
Publishing Director: Air Commodore J. Langston, CBE, FBIM, Secretary General.
Editor: Jane Dunmore.
Advertising: Peter Mitchell.
Issued gratis to Members and Representatives of Members.
1986 subscription rate for CLEAN AIR — £11.95 post free. Advertising Rates available on application.
CLEAN AIR is the official journal of the Society, but the views expressed in contributed articles are not necessarily endorsed by the Society. Abstraction and quotation of matter are permitted, except where stated, provided that due acknowledgements, including the name and address of the Society are made. Technical articles of full page length, or over, in CLEAN AIR are indexed in Current Technology Index. Abstracts are included in Environmental Periodicals Bibliography (EPB).

INTERNATIONAL CONFERENCE ON THE BIOLOGICAL EFFECTS OF IONISING RADIATION

24 and 25 November 1986
The Hammersmith Hospital, London

Conference Chairman
Professor Sir Richard Southwood FRS

Conference Organiser
Dr. Robin Russell Jones MRCP, Chairman of the
Friends of the Earth Pollution Advisory Committee

Friends of the Earth (UK) and Greenpeace (International) are sponsoring a two-day conference which will debate the scientific evidence relating to ionising radiation and its effects at low levels of exposure. Speakers and session chairmen of international renown have been chosen on the basis of their current research involvement in the topic, with particular reference to data which offers new insight into the subject.

Topics include: the variation in individual sensitivities to ionising radiation; childhood cancer and its relation to background levels of radiation; the epidemiology of leukaemia; and the biological impact of Chernobyl on populations in both Eastern and Western Europe.

The Conference is open to all interested parties.

Conference fee – £90 (including VAT)
Reduced price for voluntary organisations and
individuals on request.

Registration/further details – Dr. Gari Donn
26 Hawkenbury Way, Lewes BN7 1LK
Telephone (0273) 473096

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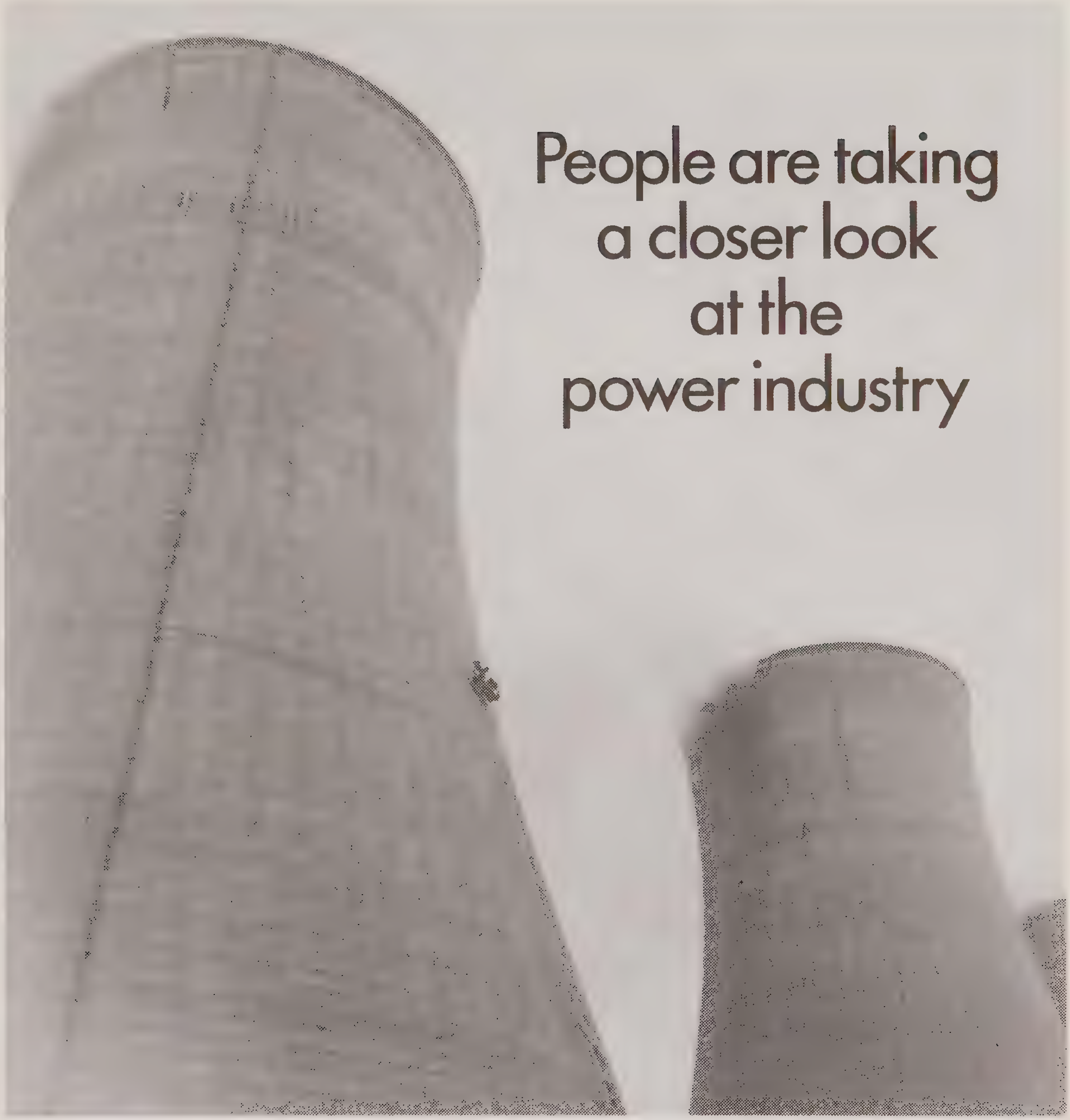

The electricity supply industry, once rarely in the news, is now the centre of controversy. Plans to build new power stations are strongly opposed, and people are concerned about acid rain, nuclear waste and the Chernobyl disaster.

The CEGB has a statutory duty to maintain an economical electricity supply, and we have a viewpoint too. To learn more about it please visit our stand at the Clean Air Exhibition on 27-30 October 1986.

CEGB
GOOD NEWS FOR ELECTRICITY

Central Electricity Generating Board, Sudbury House, 15 Newgate Street, London EC1A 7AU.

Reader Enquiry Service No. 8627

COMMENT

This summer has seen some encouraging developments. The Government, spurred on by the ever-greener complexion of the other parties, announced the formation of a new combined Inspectorate of Pollution. This declaration of intent is welcome news – especially to the NSCA, which has long urged such a development, involving as it does transfer of the Industrial Air Pollution Inspectorate from HSE to the DOE.

More recently, the Government authorised the CEGB to retrofit 6,000 MW of electricity generating capacity with flue gas desulphurisation equipment, starting with the newly commissioned Drax B Power Station. The retrofit programme is to be phased over a 9 year period, from 1988 to 1997, and a commitment has been given that all further new coal-fired power stations will be fitted with FGD, "to the requirements of the Industrial Air Pollution Inspectorate". The Government announcement was hedged with provisos relating to engineering and scientific studies, yet the move is in the right direction, if too little and too slow.

The implications for British industry and the CEGB in particular were discussed at the Conference (co-organised by NSCA and the IEEP) held just one week after Mrs. Thatcher's Oslo declaration. This was a high level debate which provided the first opportunity for our European partners to give their verdict on how far the UK control measures matched up to their hopes and expectations. Britain has not joined the 30% Club, perhaps a presentational mistake since the net reduction secured could reach almost that order of SO_2 reduction, although over a longer period. By not joining the 30% club. Britain forfeited early acclaim but more important is the implication that Environment Ministers have lost their battle to make real progress within Europe on the large combustion plant Directive. The first hurdle was always to convince the Prime Minister and the rest of the Cabinet that the proposals on emission controls for large plants are a realistic and achievable target for Britain. The Industrial Air Pollution Inspectorate, however, is showing the way with an initiative on new emission limits for large boilers and furnaces, which, when finalised, should ensure that Britain meets the same standards for new combustion plant as the most advanced of our European neighbours.

ASBESTOS

LOCAL AUTHORITY ACTION GUIDELINES

by
G.D. Thomson
Liverpool City Council

Paper presented at NSCA Spring Workshop on Asbestos, 26-27 March 1986

INTRODUCTION

It has long been recognised that asbestos presents health risks which can result in illnesses and deaths. During this century, there have been many reports on the subject and much new legislation has been introduced. However, deaths have continued to rise and public concern has increased, particularly over the last few years. People have expected action to be taken by various groups:

- by the Government, in passing new legislation;
- by the HSE, in setting standards and introducing health and safety provisions; and
- by industry and commerce, in carrying out their activities in such a way as to minimise the risk to the health of employees and the public.

People also have expectations of local authorities. When asbestos is found in Council-owned property and action is required, the public expect prompt and efficient service. When members of the public ask for advice, they expect local authorities either to be able to provide it, or put them in contact with people who can.

After all that has happened and been said in relation to asbestos, and all the publicity the risks have received, particularly over the last few years, there is no reason now why the public should get a poor service from the local authorities and no reason for panic in Council ranks when the material is discovered in their properties.

Local authorities should be organised, and that means planning to enable reactive and proactive action to be taken in an efficient, effective and economical way. My aim is not, like Moses, to come forth with tablets of stone on which are writ the 10 Commandments for asbestos, but rather to put forward thoughts which will help local authorities to review action they are taking at the moment and, in cases where no formal policies or approaches have been developed, to provide guidance by raising the issues that require consideration. I shall review not only the public sector but also, more briefly, the involvement and influence Councils can have in the private sector.

NEGATIVE AND POSITIVE APPROACHES

In my view, local authorities can take one of two approaches:

- either a *negative* one, which involves taking no action and making no preparations but trying to sort emergencies out when they arise;

- or, they can be *positive,* in which case the local authorities have made decisions about what action to take. It may be confined to the action to be pursued when asbestos is found. It may be more extensive than that, including matters such as identification, purchasing policies, etc.

The choice is not between low key approaches, or ones that are high profile, extensive and expensive. The real question is whether the local authority has stopped to consider what action it should take in relation to asbestos: has it made the necessary decisions so that positive action is, or can be, taken?

Some local authorities have the negative approach, others have the positive approach and still others are in a transitional stage between the two.

POLICIES

When local authorities consider the overall action that is going to be taken for asbestos, decisions have to be made about the type of policy to be adopted. This is fundamental, for the policy will substantially affect action subsequently taken by the authority.

Determination of policy should be tackled in an orderly fashion. The first step is evaluation of available information, e.g. the Doll and Peto Report, HSE guidelines, information produced at workshops, conferences etc.

The second stage is to make decisions on the overall policy, with two principal choices:

(a) to decide not to do anything — that the LA will sort things out as and whey they arise: no policy is developed and no contingency plans made to deal with problems arising from damaged asbestos;
(b) to decide to have a definite policy, the type and extent of which is influenced by opinions as to the degree of actual and potential risk.

Some may conclude that there is a risk from asbestos when it is in a damaged condition and therefore the policy will be to have positive, planned reaction to such situations arising.

Others may accept the need to deal with the risk presented by damaged asbestos but will want to go further, stimulated by concern about the potential risk from the material being damaged by vandalism or in situations which require maintenance work to be carried out.

A positive policy could include the following elements.

1. A ban on the use of asbestos related products in local authority premises. In exceptional circumstances, where acceptable substituted do not exist, it should be clearly demonstrated that no suitable alternative is available.

2. Identification of asbestos and asbestos related products in local authority premises in order to quantify clearly the overall problem.
3. Progressive removal of asbestos and asbestos related products from local authority premises, with replacement by substitute materials which will not reduce the level of protection or insulation provided.
4. The use of asbestos and asbestos related products in any Council activity to be prohibited where viable substitutes exist.
5. The use of asbestos and asbestos related products in property other than that owned by the local authority to be discouraged.

The extent of the Council's policy towards asbestos will be influenced by the interpretation placed on the phrase "progressive removal".

After the TV programme, "Alice – A Fight for Life", there were ridiculous situations in which there were demands for asbestos to be removed from all Council owned premises within two or three weeks. At that point people began to realise the extent of asbestos in such property.

Some local authorities have now imposed timescales on their programmes for dealing with asbestos, with some (London) authorities aiming to achieve removal in a period of about 5 years. Other LAs are working to a longer period of time such as 15 years, while still others may have no definite timescale.

Policies can be far more detailed and extensive and include factors such as:

- the notification of statutory undertakers, fire brigade and contractors about the presence of asbestos;
- determination of the levels of airborne asbestos fibres that should not be exceeded;
- the use of substitute materials;
- the provision of training and information.

It can be seen that the policy greatly influences the action taken by a local authority regarding asbestos. The direction taken is very much built on the decisions contained in the policy.

CORPORATE APPROACH

Another point that must receive attention during the initial stages is the development of a corporate approach. Consideration should be given to forming a working group of those functional disciplines who will be, or are already, involved with asbestos.

In Liverpool the Environmental Health Department drew together the City Estates Surveyor – who is responsible for the fabric of buildings – Heating and Ventilation Engineers of the City Architects, the Council's Safety Officer, representatives of the Maintenance and Building Works Department, and a top manager from the Personnel Department. This group consists of officers involved with asbestos. In addition to this, there is an Asbestos Working Party for the Council, made up of elected members, trade union representatives and officers. The Working Party is accountable to the Planning and Economic Development Committee.

IDENTIFICATION OF MATERIAL

Plans and records etc are essential in building up a register of where asbestos material is located. Invariably the local authority will begin with limited information about its presence and type. There will also be little information about its extent and condition. Therefore, to identify material the local authority will almost certainly need to survey. There are various ways of doing this, using:

(a) outside contractors – these are expensive, and I have not heard of authorities doing this;
(b) a special team/unit developed to survey and take remedial action, such as Sheffield City Council has;
(c) a survey team from existing personnel: Westminster City Council has such a team, with representatives from a number of Departments, with a Senior Environmental Health Officer in charge and its own analyst, laboratory and computer;
(d) existing staff – as Liverpool City Council does.

It is vital to ensure that the authority uses a competent analyst. Both the RICE and the NAMAS schemes provide some guarantee.

SURVEY

When asbestos is thought to be present, it is important to determine the

- type of asbestos
- type of material (hard, soft, lagging, etc)
- what it is used for
- where it is located
- how much has been used
- condition

need to collect information to enable decisions to be made later re. action to be taken.

Several points should be borne in mind. First, finding asbestos may require a diligent and determined search. Staff carrying out sampling must be suitably trained and experienced. Secondly, taking samples will involve damaging material and thus can result in fibre release – therefore precautions should be taken. Arrangements must also be made to repair areas from which samples are taken, and any waste material must be disposed of in an appropriate manner.

ACTION ASSESSMENT

Asbestos will invariably be identified in a large number of premises. The AMA survey showed that many local authorities were finding, or suspecting, asbestos in 80-90% of their property. Therefore, a controlled strategy including remedial and preventative measures needs to be developed based on an assessment of relevant factors.

The main factors to be considered should include

- quantity and type of asbestos
- nature and condition
- frequency of disturbance or damage to the material
- location
- amount of dust released
- use of building
- life expectancy of building, plant, etc, associated with asbestos.

Systems of assessment based on assigning weighting numbers to the various factors are sometimes used. In the draft of the revised document *Asbestos Materials in Buildings* the DOE has stated that, due to inconsistencies between staff and the lack of correlation between measured airborne asbestos concentrations and calculated ratings, number-based systems are not recommended for the selection of remedial measures for individual installations, but may be useful in setting priorities for action.

The areas which should receive priority attention will generally be those where there is clear evidence of dust release; and where people, especially children, will be exposed for long periods to asbestos.

Therefore, clear guidelines are needed on the way action assessment is to be undertaken.

REMEDIAL TREATMENT

The DOE booklet, *Asbestos Materials in Buildings,* gives advice to local authorities. This is currently being reviewed, and a revised version is due to be published in 1986.

Various remedial measures are suggested.

1. Management
   This option does have some inherent risks (ref. AMA document, P.14 para 6.3). Procedures must be adopted which ensure that users, occupiers and maintenance workers are not exposed to fibres at a future date. Another need is for careful recording and identification of asbestos, so that the required inspection at regular intervals can easily be carried out.
2. Sealing (encapsulation) and repair.
3. Enclosure.
4. Removal.

The local authority has to consider what action will be taken when asbestos is found. To some extent, action will depend on the predetermined policy. If progressive removal is LA policy, then removal will be the main course of action. Local authorities will also have to decide who will carry out the remedial work, there being three main options.

1. **Outside contractors**
   If these are used, the LA must ensure that they are licensed (it is also advisable to use members of ARCA or TICA). The LA should scrutinise the firm's safety and training policies. Schedules also need careful preparation – consult the AMA document *Asbestos. Part 2: Model Specifications and Contract Documentation.*

2. **Council team**
   Various matters require consideration, including:
   - the composition of the group – whether it should include registered thermal engineers, joiners, laggers, etc;
   - provision of equipment and transport – the type, how to acquire, e.g. lease, hire or buy;
   - protective clothing;
   - provision of training;
   - extent of operations – does it include survey work and all remedial operations such as encapsulation and removal;
   - financial implications.

3. **Outside contractors/Council employees**
   In certain authorities, council staff undertake work mainly with hard asbestos whilst contractors are used for situations involving lagging.

Substitutes

The local authority should consider what substitutes are going to be used in Council property, either to replace asbestos when it is removed or as alternatives to the material in new construction work.

Essentially, the LA must ensure that the replacement by substitute materials does not
(a) adversely reduce the level of protection or insulation, nor
(b) provide further risks to health.

Should **outside contractors** be used, someone within the local authority must find out:
(a) the substitute material to be used
(b) the level of protection/insulation provided
(c) any possible risks to health
(d) other factors such as the durability of the product.

Where **Council employees** undertake work with asbestos, substitute materials have to be found which provide an acceptable level of protection/insulation, are not sources of health risks, and are durable.

Someone within the authority must be made responsible for collecting and collating available information, scrutinising and advising on proposals by external contractors or, where Council staff are undertaking the remedial work, advising on the substitute.

Remedial Treatment – Planning the Approach

Once again, the approach depends on the authority's adopted policy.

If the decision is to remove asbestos as and when deemed necessary, remedial treatment will only be undertaken when these situations arise.

If the policy is one of progressive removal, then the priority areas requiring urgent attention must be the subject of immediate action. For the remaining areas it is necessary to develop a programme based on priority assessment. Factors that should be considered are the inclusion of work in maintenance/modernisation programmes; and the life expectancy of the building. If the latter is short, removal can be left until demolition unless its condition makes immediate removal essential. The introduction of management systems and possibly sealing the material might suffice in most short-life buildings.

Procedures when Asbestos found

Whatever its policy, a local authority must develop clear procedures so that employers know what to do –

(a) when asbestos is discovered during maintenance/modernisation work, or
(b) when the possible presence of asbestos is reported.

Industrial Relations

The basic requirements are:

(a) to ensure that staff are properly trained and provided with necessary equipment and protective clothing (this not only applies to manual staff engaged on an asbestos team, but also to the professional and technical staff such as environmental health officers and safety officers);

(b) to develop safe systems of work/codes of practice in consultation with unions (eg in Liverpool a Code of Practice has been developed regarding the removal of asbestos and therefore staff are aware of the defined procedure).

Information to Council employees

Two measures are essential:

(a) training and full information for members of staff who could be involved directly or indirectly with members of the public, eg staff at enquiry points, rent collectors etc

(b) information for the rest of the Council's staff about the policy on asbestos.

There are various options open to the authority, including short training seminars, information leaflets, provision of other material, eg AMA documents.

Information to Public

Two main types of information should be available to the public:

(a) general information about asbestos;
(b) more detailed advice on what to do when asbestos is found, or suspected to be present.

Again, the authority has to provide such information. One source already available is the DOE leaflet which gives general advice and tells householders to contact their Environmental Health Department. In addition, some local authorities have produced leaflets for tenants in Council property.

It is also necessary to decide whether certain Council staff will be designated to provide advice; for example reports about asbestos from the public may be taken at enquiry points whilst, in the event of advice being required, the public should always be directed to environmental health officers.

ACTIVITIES

Asbestos products could still be used in essential local authority activities such as vehicle maintenance. For health and safety reasons, such activities need to be identified and
(a) substitute materials considered;
(b) safe systems of work developed;
(c) proper protective clothing, equipment, etc. provided.

FINANCE

Activities relating to asbestos can be expensive. Examples of this are the cost of over £140,000 for the identification undertaken by the City of Westminster whilst two other authorities are currently spending £2.5 million and £200,000 respectively on "fire fighting" operations alone. In certain instances, where extensive planned approaches have been developed, the annual budgetary requirement has been found to be as much as £2m to £5m. The ILEA allocated £50m to deal with asbestos in schools.

The Government has stated that the requirement to deal with asbestos is taken into consideration when local government finance is prepared and grant aid determined. Statements which remind one of Sir Humphrey in "Yes, Prime Minister" are not uncommon:

> Full and serious consideration is given each year to the difficulties facing local authorities with regard to asbestos .... etc.

Consideration *may* be given, but adequate provision is another matter.

The AMA report last year estimated that £4 billion was needed by the AMA member authorities alone to deal effectively with asbestos over the next 20 years. Even the Housing Conditions Survey for 1985 identified a need for £185 million to deal with hazardous asbestos material — let alone total removal.

However, it does appear that some local authorities are using the lack of provision of finance by central government as an excuse for taking little or no action. Much of the action that has been outlined in this paper can be undertaken with little extra cash being provided beyond that now being spent on "fire fighting" activities; for example the development of policies, the adoption of procedures in the event of asbestos being found, the distribution of the DOE's leaflet to the public, and the provision of internal information or training for staff all cost little.

PRIVATE SECTOR STRATEGY

The following factors have to be considered when drawing up guidelines for the private sector.

1. **Health and Safety Enforcement** The health and safety legislation on asbestos is enforced either by HSE or local authorities. The new enforcement allocation regulations will increase the local authority proportion of this work — for example, in Liverpool the present ratio of 9,000 out of 13,000 premises will increase to over 10,000 out of 13,000. Officers must be properly trained and equipped to do this work. Trading Standards Officers are also involved in enforcing certain legislation relating to asbestos.

2. **The local authority** of necessity becomes involved in situations that could affect health, eg when asbestos is dumped on land, and when work with asbestos that may affect other property is carried out.

3. **Demolition** Whilst the Health and Safety Executive are responsible for the enforcement of health and safety legislation when demolition takes place, local authorities can have other involvement. A recent HELA circular stressed the need for a close working relationship between the two organisations.

4. **Provision of Information to the Public** Local authorities are regularly approached for advice and information from commerce and industry and from members of the public generally, environmental health officers invariably undertaking this work.

5. **Emergency Planning** In recent years, there have been fires which have resulted in asbestos being scattered into the surrounding environment — eg, at Donnington, Cricklewood and Sheffield. The authority should consider the preparation of an emergency plan so that it can react positively if such an event occurs. If asbestos is distributed over a wide area, the authority may have to
   (a) deal with public concern;
   (b) arrange for material to be safely collected and disposed of from gardens, fields, etc;
   (c) have any remaining asbestos removed from the remains of the fire damaged buildings.

   Liaison should take place with the Fire Authorities, etc. to determine respective areas of responsibility.

6. **Redevelopment of Contaminated Land** The development of land can result in asbestos being disturbed — typical sites include gas works, scrap yards, waste disposal areas and chemical and heavy industrial works. Local authorities should arrange for the assessment of the potential hazard to be carried out before new land uses are agreed and should follow advice given in various reports published by the DOE (Inter-departmental Committee on the Redevelopment of Contaminated Land) and the draft British Standard on the subject.

Ways in which the Local Authority can influence the private sector

1. The authority can insert a condition in Improvement Grant Schemes that no asbestos materials should be used where suitable substitutes exist.
2. Suitable conditions can also be included in leases, with the LA providing a model clause.
3. The authority's environmental health department can given appropriate advice with planning applications, though regard has to be paid to Building Regulations provisions.
4. **HIMOs** Local authorities can take steps to persuade owners to use substitute materials when undertaking special grant work. In addition, any work carried out by local authorities in default or whilst having control under a management order would not involve the use of asbestos materials.

REFERENCES

1. Department of the Environment. Asbestos Materials in Buildings.

2. AMA Report on Asbestos. Part 1: Policy and Practice in Local Authorities. Part 2: Model Specifications and Contract Documentation.

NSCA ASBESTOS WORKSHOP – 26-27 MARCH 1986

110 delegates and 17 speakers and chairmen met at the University of Newcastle upon Tyne in the middle of a wintry spell of early spring weather. The theme of the workshop was "Asbestos – Policies for the Future" and many delegates had come looking for reassurance that their policies were on the right track, or seeking guidance if their authority had yet to evolve a policy. The event was structured to cover the vexed question of risks to health from asbestos fibres, measurement of fibres, a variety of approaches on dealing with asbestos, case histories of removal and emergency situations, culminating in discussion of local authority guidelines and the presentation of facts and information to the public. Altogether, the event was a resounding success. In the words of one delegate who was kind enough to write in afterwards, "During the last few years I have attended several seminars on asbestos and asbestos regulations; however, I have to say the one at Henderson Hall was without doubt one of, if not *the* best. At last the problems associated with asbestos were placed in perspective and ... I consider that anyone attending the session, no matter how much they had been involved in asbestos, could not have failed to learn something."

We hope that the paper reproduced above will enable all our readers to share some of the Workshop wisdom.

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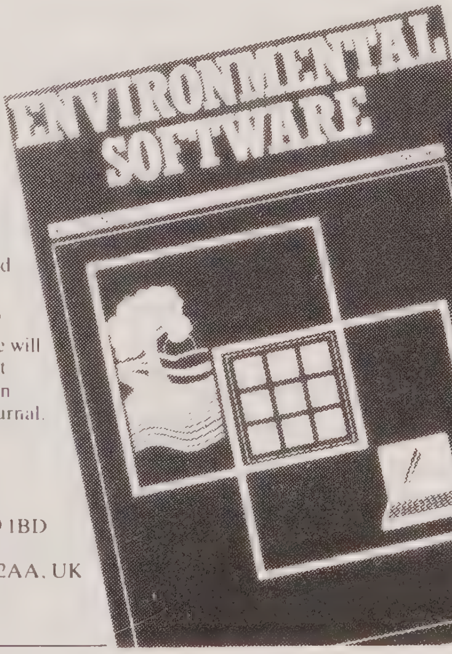

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FUTURE EVENTS

1986

19 – 24 OCTOBER 1986 – "Oil Pollution Control Course"

Organisers: The Institute of Petroleum and Warren Spring Laboratory (WSL).

Speakers: Mr. Peter Morris (WSL) and specialists from Kent County Council, Marine Pollution Control Unit (Department of Transport), MAFF, International Tanker Owners Pollution Federation, and others.

Aims: The course is intended to give students both practical and theoretical training in the various responses to oil spillages at sea and in harbour and show how these are adapted to meet the needs of chemicals spilt at sea.

Venue: Orwell Moat House, Felixstowe, Suffolk

Details: Miss Caroline Little, Conference Officer, Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR Telephone: 01 636 1004 Telex: 264380

27 – 30 OCTOBER 1986 – 53rd. Clean Air Conference, Blackpool

Have you registered yet? This promises to be a memorable conference both for technical content and social events – NOT TO BE MISSED!

Topics: Pollution Control; Combined Heat and Power; Air pollution updates; Noise; Ozone and CO_2.

Registration: NSCA, 136 North Street, Brighton BN1 1RG Telephone: Brighton (0273) 26313

30 OCTOBER 1986 – "Noise and Vibration in the Aircraft and Spacecraft Industry"

Organisers: The Industrial Noise Group and the East Midlands Branch of the Institute of Acoustics.

Topics: Current noise problems in the aerospace industry; noise and vibration problems associated with spacecraft (if there is sufficient interest); and a talk and demonstration of the recently commissioned noise monitoring system at Birmingham International Airport.

Venue: Birmingham International Airport

Details: Meeting Organiser, Mr. S.C. Bennett, Chairman IoA Industrial and Aerodynamic Noise Group, c/o Mining Headquarters Technical Dept., Ashby Road, Stanhope Bretby, Burton-on-Trent, Staffs. DE15 0QD.

10 – 13 NOVEMBER 1986 – "International Trade Fair for Waste Processing and Environmental Technology" ("Afvaltech")

Organiser: The Government of the Netherlands.

Themes: Waste-management and recycling; soil and air pollution.

Venue: Jaarbeurs Exhibition Centre, Utrecht, The Netherlands

Details: Jaarbeurs, Royal Netherlands Industries Fair, P.O. Box 8500, 3503 RM Utrecht, The Netherlands Telephone: 030 955911 Telex: 47132 JAARB NL

11 – 14 NOVEMBER 1986 – COURSE – "Hazardous Waste Management"

Organiser: Centre for Extension Studies, Loughborough University
Loughborough will be running another course **"Advanced Hazardous Waste"** from 25 – 28 November 1986.
Themes: Both courses will take into account the latest experience in research and management and will pay particular attention to any difficulties which may have arisen following the abolition of the Metropolitan County Councils and the Greater London Council.
Venue: Centre for Extension Studies, University of Technology, Loughborough, Leicestershire LE11 3TU Telephone: 0509 263171 extension 213/249 or 486/488 Telex: 34319

18 – 22 NOVEMBER 1986 – "Pollutec '86 5th International Pollution Control Exhibition"

Organiser: French Chamber of Commerce
There will be a wide range of exhibits from the following fields: air, noise, waste-management, water, clean technologies, and engineering.
Venue: The Eurexpo Exhibition Centre, Lyon, France.
Details: French Chamber of Commerce House, 54 Conduit Street, London W1R 9SD Telephone: 01 439 3964 Telex: 269132 FRACOM

24 – 25 NOVEMBER 1986 – INTERNATIONAL CONFERENCE – "The Biological Effects of Ionising Radiation"

Organisers: Friends of the Earth UK and Greenpeace International.
Topics: The variation in individual sensitivities to ionising radiation; childhood cancer and its relation to background levels of radiation; the epidemiology of leukaemia; and the biological impact of Chernobyl on populations in both Eastern and Western Europe.
Venue: The Hammersmith Hospital, London
Details: Dr. Gari Donn, BEIR Conference, 26 Hawkenbury Way, Lewes BN7 1LK Telephone: Brighton (0273) 473096.

24 – 25 NOVEMBER 1986 – "Emergency Planning" – A Two Day Seminar

Organisers: IBC Technical Services Limited
Themes: All factors relevant to emergency planning under the CIMAH regulations, also related aspects outside the scope of the regulations. Of interest to local authorities and emergency services planners, transport organisations, large and small companies involved in handling hazardous materials.
Venue: The Cafe Royal, London
Details: Helen Raquet, IBC Technical Services Ltd, Bath House, 3rd Floor, 56 Holborn Viaduct, London EC1 Telephone: 01 236 4080 Telex: 888870

20 – 25 NOVEMBER 1986 – 1st Taipei International Symposium / Exhibition – "Modern and Most Practical Technologies in Environmental Protection, Where Space and Energy Saving is Essential"

Organiser: Environmental Protection Society of the Republic of China.

Topics: Pollution control: air, water and noise; Waste Disposal; Ocean pollution control/coastal area/protection Laboratory Test Equipment (Exhibition only).
Venue: The Sun-Shan World Trade Centre, Exhibition Centre
Languages: Chinese and English
Details: Demina Massey, Commercial Assistant, Anglo-Taiwan Trade Committee, 4th Floor Minster House, 272-274 Vauxhall Bridge Road, London SW1V 1BB Telephone: 01 828 9167 Telex: 896941 ATTIC

4 DECEMBER 1986 – CONFERENCE "Sound Insulation of Buildings and Building Elements"
Organisers: Institute of Acoustics and Building Research Establishment
Theme: Sound insulation of new buildings, converted buildings and building components.
Venue: The Building Research Station
Details: Meeting Organiser: Dr. L.C. Fothergill MIOA, Building Research Station, Garston, Watford WD2 7JR Telephone: 0923-674040

14 – 16 DECEMBER 1986 – CONFERENCE "Unhealthy Housing – A Diagnosis"
This conference will bring together recent studies of the effects of housing conditions on the health of the occupiers.
Organisers: The Legal Research Institute, University of Warwick and the Institution of Environmental Health Officers.
Topics: A wide variety of housing conditions which affect the health of occupiers from pervasive damp to intolerable noise levels. Of interest to those involved in the medical and health related professions as well as architects, planners and housing officers.
Venue: The University of Warwick
Details: Rosemary McMahon, Health and Housing Conference Administrator, The Institution of Environmental Health Officers, Chadwick House, Rushworth Street, London SE1 0QT Telephone: 01 928 6006

1987

2 – 6 MARCH 1987 – INTERNATIONAL CONFERENCE – "Energy Transformations and Interactions with Small and Mesoscale Atmospheric Processes"
Themes: Atmospheric response to waste heat release from thermal power plants, urban and industrial areas; and interactions between pollutants and small or mesoscale meteorological processes.
Venue: The Swiss Federal Institute of Technology Lausanne, Switzerland
Language: English
Details: For participants from North America: Professor R.A. Pielke, Dept. of Atmospheric Science, Colorado State University, Fort Collins, Colorado, 80523, USA; For all other participants: Dr. M. Beniston, Iener, Dept. Genie Civil, Swiss Federal Institute of Technology, CH-1015 Lausanne, Switzerland Telephone: 021 472516 Telex: 24478

24 – 26 MARCH 1987 – NSCA WORKSHOP – "Indoor Air Quality – Acceptable Standards & Building Design"
Topics: The changing built environment; major air pollutants; other pollutants; the variable human factor; and integrated design for a quality environment.
Details: NSCA, 136 North Street, Brighton BN1 1RG Telephone: 0273 26313

6 – 9 APRIL 1987 – International Pollution Abatement Fair – "The Technology of Environmental Protection"
Organisers: Brintex Limited
Sponsors: DOE, CBI
Theme: The fair will be held to mark the beginning of the European Year of the Environment alongside ICE '87 – The Public Works and Municipal Services Congress and Exhibition
Venue: The National Exhibition Centre, Birmingham
Details: Miss Anna Grabham, Exhibition Organiser, Brintex Ltd, 178-202 Great Portland Street, London W1N 6NH Telephone: 01 637 2400 Telex: 262568 MUNBEX G.

19 – 21 MAY 1987 – VII International Environment and Safety Exhibition and Conference
Organiser: International Environment and Safety (Labmate Ltd.)
Themes: Laboratory safety and analytical instruments for environmental analysis will be included in this exhibition, held in conjunction with ROSPA's International Safety Exhibition. Other subjects include: Particle size analysis; Noise and pollution control; Gas detection and monitoring; Asbestos and dust sampling; Health and safety; Environmental protection and occupational hygiene.
Venue: The Birmingham National Exhibition Centre
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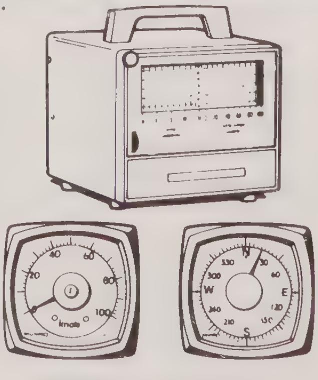

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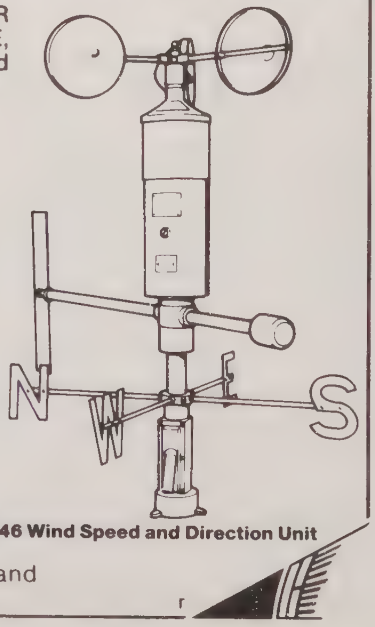

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BOOK REVIEWS

AIR POLLUTION INJURY TO VEGETATION

The IEHO has published a guidance manual, "Air Pollution Injury to Vegetation"; originally commissioned by HM Industrial Air Pollution Inspectorate (IAPI), and prepared by a team at Imperial College Centre for Environmental Technology. Its purpose is to provide a guide to the identification of one cause of plant injury: air pollution. It includes 48 colour plates, and compares air pollution injury with natural stresses and other causes of damage.

The manual, an invaluable reference for all those involved in identifying pollutants and the causes of plant injury, may be ordered direct from IEHO at Chadwick House, Rushworth Street, London, SE1 0QT, price £20.00.

Another useful book in the same field is "*Plant-fluoride Relationships*" by David Doley, published by Inkata Press, which looks specifically at injury to plants caused by fluoride-containing gases and aerosols. This type of injury to agriculture and forestry was first recognised around the middle of the 19th century and occurrence of fluoride injury in vegetation, and fluoride distribution in the terrestrial and aquatic ecosystems from industrial pollution, are now common and widespread. Fluoride-containing gases and particles are emitted near alumina reduction smelters, phosphate fertiliser plant and elemental phosphorous factories, brickworks, glass and enamel factories and many other processes.

This book is an analysis based on the author's own research, with particular reference to Australian vegetation. It is intended first to assist fieldworkers in the recognition of fluoride injury, and distinguish these symptoms from other forms of injury and secondly, to aid the understanding of the effects of fluoride on plants. That last objective should give the book a readership outside the Australian sub-continent. The book is available from Inkata Press Pty Limited, 4 Longborne Avenue, North Clayton, Victoria 3168, Australia price Aus. $45, with $4 post and packing.

WORLD RESOURCES 1986

A magnificent compendium of facts and figures has been assembled in one publication under the heading "World Resources 1986" with the intention of assessing the resource base that supports the global economy. The focus is international, examining loss of tropical forests and good farmland, transboundary pollution and global levels of essential resources. The report presents data tables for 146 countries, covering the recent past and the present. It does not attempt to project the future but this is the inaugural volume of an annual series which will constantly update the reader; trends are presented and discussed, especially where projections have been the subject of intense study, as in the case of population and energy.

Because this is the first volume in a series, it does not try to cover all the important topics in the vast field of resources and the environment. For example, next year there will be an additional chapter on biogeochemical cycles covering the emerging understanding of global cycles of carbon, nitrogen, sulphur, phosphorous and methane, looking at how these cycles effect life on earth and the human role in altering them. The current volume focuses on "the atmosphere as a shared resource" as one of the major topics in the "perspectives" section and atmosphere and climate are covered later in the book, under the world resources review section, in a 22 page chapter. Further on in the book, the world resource data tables present 12 pages of tables on CO_2, CFCs, SO_2 and particulate matter. Comparable space is given to freshwater, energy, population and many other topics.

The 350 page book is easy to consult due to a tab system which indicates the four major parts of the books and then helps to locate particular chapters. This is a massively informative and excellently presented work of reference, essential for anyone involved in environment and development issues and which will give any politician pause for thought.

World Resources 1986. An assessment of the resource base that supports the global economy, published by the World Resources Institute/International Institute for Environment and Development (1986), price US $16.95 (paperback). The report is available in the UK from: IIED, 3 Endsleigh Street, London WC1H 0DD. Telephone: 01-388 2117.

SHORT REVIEWS

Porter, A., Spence, M. and Thompson, R., *The Energy Fix: The Politics of Power: Towards a Socialist Energy Strategy.*
Pluto Press (1986) £5.95.

If Britain has a wealth of energy resources and plenty of opportunity to develop them, why is she not taking up the challenge and pursuing a unified, environmentally safe energy policy? This is the question addressed in "The Energy Fix" by Porter, Spence and Thompson.

From a strongly socialist viewpoint, the authors examine Britain's attitude towards energy within an international context, analysing world energy trends and the range of energy policy options available. They then go on to consider the Conservative Government's record on energy, particularly in the light of the recent miners' strike, and discuss Green and Labour party alternatives. The writers believe that a well-defined integrated energy programme must be followed by a future Labour government as part of its overall economic strategy. A readable and thought-provoking study of "the politics of power".

Brimblecombe, Peter, Air Composition and Chemistry
Cambridge University Press (1986) £8.95

Although air chemistry has only recently become the subject of considerable public interest – even scientific awareness of its significance dates from as late as the 1950s – it is, in fact, one of the oldest branches of chemistry.

Essentially discussing the atmosphere and man's influence upon it, Dr Brimblecombe provides a thorough treatise on all aspects of air chemistry. Guiding the reader through the myriad sources of the trace gases, he then looks at the chemistry of atmospheric gases, suspended particles and rainfall. Having covered the natural atmosphere, he proceeds to examine the causes of air pollution and its effects: decline in health, damage to plants and animals, erosion of constructional materials, pollution of indoor environments, acidification of rain and changes in global carbon dioxide and methane. Finally, he considers the chemistry and pollution of the upper atmosphere, and includes an interesting section on the atmosphere of our solar system's other planets.

This book is an ideal companion for all serious students of environmental sciences, but rather inaccessible for the general reader.

"Acid-Deposition: Long-Term Trends"

Committee on Monitoring and Assessment of Trends in Acid Deposition; Environmental Studies Board; Commission on Physical Sciences, Mathematics, and Resources; and National Research Council.
National Academy Press, 1986. Price: $24.50

How damaging is acid deposition? Current opinions differ widely, in part because for every proposed link between acid deposition and adverse environmental effects, an alternative explanation based on other phenomena can be or has been proposed and in many cases cannot be readily dismissed.

The specific areas addressed in this book include emissions of sulphur and nitrogen oxides, precipitation chemistry, atmospheric sulphates and visibility, surface water chemistry, sediment chemistry and abundance of diatom taxa, fish populations, and forest productivity.

Conclusions are then drawn about the acid deposition-phenomenon relationship, identifying phenomena that are directly caused by acid deposition and suggesting others apparently caused by human activities unrelated to acid deposition.

This book, although rather technical, nevertheless provides an excellent survey of the controversial areas concerning acid rain and is an invaluable source of reference for the expert and non-specialist alike.

Perkins, Benjamin, *A Secret Landscape: Diary of Lapwing Meadows.* Century Hutchinson Limited (1986), Price: HB £14.95

Since 1940 no less than ninety-five per cent of lowland herb-rich meadows in this country have fallen prey to the plough and bulldozer. Of the remaining five per cent, just under a half have been damaged to some extent. "A Secret Landscape" charts the course of the seasons and their effects upon one small section of completely unspoilt countryside in north Essex: "Lapwing Meadows".

Meticulously documented and beautifully illustrated, this year-long diary of the flora and fauna of natural meadowland comes highly recommended to young and old, specialist and non-specialist, for the sheer pictorial and literary pleasure to be derived from this unique glimpse of a rapidly vanishing older England.

DIVISIONAL NEWS

EAST MIDLANDS DIVISION

Report on the AGM, held at the offices of the West Derbyshire District Council in Matlock, Derbys., 26 June 1986

Opening the meeting, at which 73 members were present, the Chairman of the Division, Councillor F.E. Holland of West Derbyshire District Council first welcomed members to West Derbyshire and in particular extended a welcome to Mr. R.W.C. Wheatley, Chairman of the Council of the Society and to Air Commodore John Langston CBE the Society's Secretary General.

Councillor Holland then introduced Councillor Mrs. Jean Naylor, Chairman of the West Derbyshire District Council who extended to members a warm Civic Welcome to the West Derbyshire Area. Councillor Mrs. Naylor was suitably thanked by the Chairman.

The Honorary Secretary presented his report on the activities of the Division during the preceding year, and this was followed by the financial statement for the year ended 31st December, 1985, which had been duly audited.

Councillor Holland then thanked his proposer and seconder for the opportunity of being Chairman, and said that he had enjoyed his term of office immensely. Inviting Mr. J.L. Fear, Chief Environmental Health Officer of North West Leicestershire District Council, to succeed to the Chair Councillor Holland commended Mr. Fear as a most reliable personality and someone not looking to hit the headlines.

Mr. Fear thanked Councillor Holland for his kind words and said it was a great honour to be elected to the Chair. Mr. Fear also paid tribute to the able and good humoured way in which Councillor Holland had chaired the meetings during the past year.

Other officers elected were:

Deputy Chairman	: Cllr. R.S. Chamberlain, JP
Honorary Secretary/Treasurer	: Mr. E.F. Raven
Honorary Auditor	: Mr. J.B. Sheard
Scrutineers	: Mr. A.A. Wild and Mr. J.T. Hague

and Mr. K.R. Enderby and Cllr. Mrs. E.J. Inglefield were elected to represent the Division on the Society's Council.

After addresses by Mr. Wheatley and the Secretary General, the Chairman introduced Mr. J.T. Hague, MRSH, MIEH MInstSWM, Chief Environmental Health Officer of West Derbyshire District Council, who described with the help of slides steps in processing a Planning Application for extraction of fluospar from a mine to be sunk in a West Derbyshire village, with particular reference to dust and noise control.

Mr. Hague informed members that the site was situated within the Peak National Park in a rural village some 9 miles north of Bakewell. The details submitted indicated that if approval was given, a period of 2-3 years would be required for preparatory work and it was anticipated that the vein system would have a working life of 7-8 years.

In advising the relevant planning committees of the Peak Park Joint Planning Board and the District Council, Mr. Hague's department had to carry out a thorough investigation into residents' concern which included noise, vibration, dust, radon gas and lead.

Mr. Hague informed members of how his department had assisted the Planning Committee in investigating all aspects of concern. The facts were given to the appropriate Committee, and were taken into account in determining the application. The Peak Park Joint Planning Board in approving the application made 52 planning conditions of which 23 were areas involving the Environmental Health Department.

Mr. Hague was warmly thanked for a most interesting address, after which members partook of an excellent buffet lunch by kind invitation of the Chairman and members of the West Derbyshire District Council.

In the afternoon a coach was provided to take two parties on alternative visits to two industrial undertakings — W. and G. Sissons of Calver Mill, manufacturers of stainless steel sinks and sanitary ware, and Newburgh Engineering of Bradwell, nuclear and general precision engineers. The journey to these premises took members through the Derbyshire Peak District on a day of bright sunshine, passing through Bakewell (of Bakewell Pudding Fame) Tideswell (the Cathedral of the Peak, home of Councillor Mrs. Jean Naylor Chairman of the West Derbyshire District Council and on that day the scene of the ancient custom of well dressing) and through Chatsworth (arguably the finest 'stately home' in England). Those who visited Calver Mill were also able to see the setting for the BBC television series on Colditz.

At each of the factories there were conducted tours and light refreshments were provided before departure. Thanks were expressed to the Directors of the two firms who had received our members.

E.F. Raven
Hon. Secretary

NORTHERN DIVISION

Report on the Annual General Meeting, held at Keswick, 13 June 1986

Councillor Mulgrew, Chairman of Allerdale District Council, welcomed 43 members to the Moot Hall, Keswick. He felt it particularly appropriate that they should discuss clean air at such a venue since, in his opinion, there was no town in the UK which enjoyed cleaner air. The area had had pollution problems in the past but the expertise of their Health Department had ensured that the beautiful environment was protected while industrial processes continued to benefit the local economy.

Mr. W.C. Wheatley, Chairman of the NSCA, then addressed the meeting; he congratulated the Councils of Newcastle, Middlesbrough and Hartlepool on having completed their smoke control programmes. He also acknowledged the work of other Councils in smoke control – not always an easy task in the north-east's mining communities. The Workshop on "Asbestos – Policies for the Future", at Newcastle University, had been very successful and well supported by the Division. Mr. Wheatley went on to praise the professionalism of the Brighton headquarters staff, particularly in the field of public relations.

Cllr. L. Poole was re-elected unopposed as Chairman of the Division; Cllr. T.W. Yellowley and Mr. L. Mair were re-elected unopposed as Vice-Chairmen; and Mr. W.C.B. Robson was re-elected unopposed as Honorary Secretary and Treasurer. In addition, all the past representatives serving on Council were re-elected unopposed: these were Cllr. T.W. Yellowley, Cllr. J. Lambell, Mr. R. Lander and Mr. L. Mair.

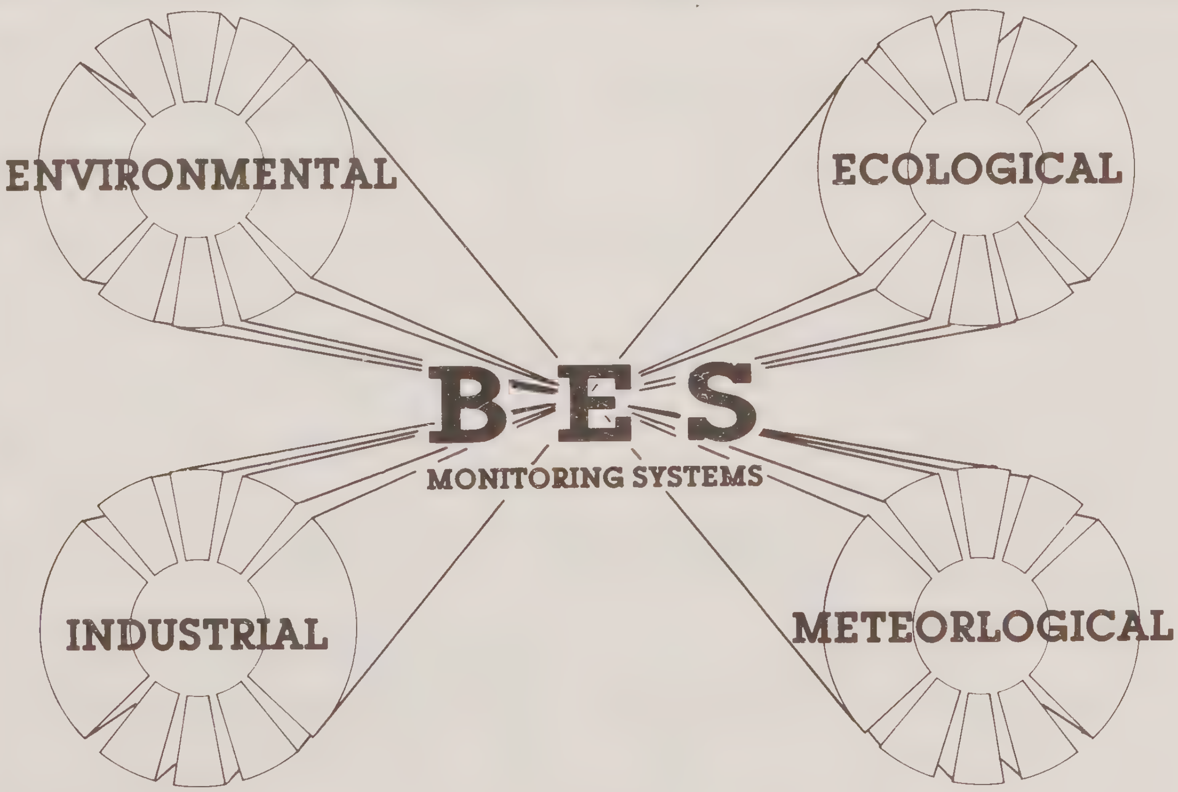
The afternoon meeting heard a joint presentation on "Environmental Aspects of Opencast Working"; this was given by Mr. W. Walton, Principal Environmental Health Officer, Allerdale District Council and Mr. M. Stott, Area Manager of the British Coal Opencast Executive. Mr. Stott explained the particular emphasis which the Executive placed on environmental aspects of the operation: noise, vibration and dust problems and the importance of water treatment and land restoration. This was in contrast to the early days of opencast mining when there had been little regard for the environment.

The practice of opencast mining was originally developed as an emergency measure by the Ministry of Fuel and Power during the Second World War. At that time success in the field had inevitably taken precedence over environmental disturbance at home. Now, contracts for opencast mining were carefully controlled by the headquarters of the Executive with engineers in the field to ensure that contract compliance was observed in every detail. The Executive recognised that it was necessary to use best possible practice in order to ensure support for their operations from the local population and council officers.

Mr. W. Walton expanded on the noise control aspect of the work. He gave practical examples of how to undertake accurate site monitoring, undistorted by local physical features. Such monitoring was essential in order to achieve improvement in noise levels but Mr. Walton felt also that more research on community response to noise was badly needed.

Mr. N. Crosby, Chief Environmental Health Officer, Castle Morpeth District Council thanked the speakers and organisers for a successful meeting.

W.C.B. Robson
Hon. Secretary



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UPDATE

MOTOR-CYCLE NOISE — MACCANC REPORT

Prompted by the rising number of complaints about motor-cycle noise being received by its constituent authorities, the Manchester Area Council for Clean Air and Noise Control's noise working group has produced a report on the subject.

This is an up to date, concise and informative document on all aspects of motor-cycle noise. It brings together over 34 separate reports, surveys and pieces of legislation, providing anyone involved with noisy motor-bikes with a handy reference book. Included are historical and technical backgrounds, the results of surveys to determine the extent of the problem, and a critical review of relevant legislation. The surveys comprised postal responses from over 1200 residents in the MACCANC area and from most Metropolitan District councils in England.

The report concludes that the confusion of existing legislation makes the control of noise from motor-cycles, particularly when they are off the roads, generally ineffective.

The report recommends complete rationalisation of legislation to incorporate a simple 'in use' motor-cycle machine noise test, in line with NSCA policy, and suggests that meaningful penalties should be imposed on offenders.

Copies may be obtained at a cost of £5.00 including postage: postal order or cheques should be made payable to "The Manchester Area Council for Clean Air and Noise Control" and should accompany the order to:— The Publicity Officer, Mr. A.G. Ward, Principal Environmental Health Officer, City of Salford, Environmental Health and Trading Standards Department, Crompton House, 100 Chorley Road, Swinton M27 2BE. Telephone (061) 793-3276.

REVIEW OF AIR POLLUTION CONTROL

The Department of the Environment has indicated some of the changes to be proposed in a consultation document, promised for the autumn, on the review of air pollution control in Great Britain.

These changes include the introduction of new local authority control on gaseous emissions in line with current powers to control grit, dust and fume; a new offence of burning any material (unless exempted) whose combustion would necessarily give rise to dark smoke; power to prosecute not only the occupier but any person causing or permitting dark smoke to be emitted from premises; new clarification of the term "premises" to leave no doubt that it can include open land; the inclusion of non-dark smoke emission from dwellings outside smoke control areas within the ambit of the statutory nuisance provisions of the Public Health Act: and control of fuel content as new, potentially hazardous synthetic fuels may come onto the market.

The consultation document is also expected to canvass views about ways of controlling the supply of unauthorised fuel in smoke control areas, chimney heights, and illegal cable burning.

NEW PESTICIDES REGULATIONS

New statutory controls over the supply and use of pesticides were approved by Parliament in July and will come into force from October 1986. The Regulations implement Part III of the Food and Environment Protection Act 1985 and will:

- define the range of substances to be controlled;
- provide for the approval of these substances, subject to certain conditions;
- spell out controls to be imposed on the advertisement, sale, supply, storage and use of pesticides, *including aerial applications;* and
- set out the basis for making information about pesticides available to the public.

Substances being controlled are pesticides used in agriculture, horticulture, forestry, food storage, and public health and hygiene; wood and masonry preservatives, and anti-fouling paint and microbiological pest-control agents including those which are genetically engineered. The Regulations apply to all of the above from 6 October 1986 except for the anti-fouling paints which will be controlled from 1 July 1987. Regulation 4 prohibits the advertisement, sale, supply, storage and use — including aerial spraying — of any unapproved pesticides unless there is a general Ministerial consent of the activities and any conditions attached to the approval are complied with. Regulation 5 deals with approvals and Regulation 6 and the relating schedules deal with consents.

Approvals can take three forms: an experimental permit, a provisional approval, and a full approval. These may be subject to conditions and may be reviewed or revoked, suspended or amended at any time. Consents are to be published in the London and Edinburgh Gazettes. It is through the conditions laid on consents that Ministers will impose general controls on approved pesticides.

Schedule I to the Regulations relates to advertisements and provides that only approved uses of a pesticide may be advertised and that the advertisement must name the active ingredient in the pesticide and include any general or specific warnings — for example, "dangerous to bees". The controls on advertisements do not come into force until 1 January 1987.

Schedule II relates to the sale, supply and storage of pesticides and imposes a general obligation on all those who handle pesticides in such ways to take precautions to protect health, safeguard the environment and be competent. People selling and supplying agricultural pesticides must also obtain recognised certificates of competence, or work under the direct supervision of a certificate holder. Certificates currently issued by the British Agrochemicals Standards Inspection Scheme (BASIS) will be recognised as meeting this requirement but other certificates could be recognised in future.

Schedule 3 relates to use, and imposes general obligations for protection of health and the environment and assurance of competence. It requires contractors — including aerial sprayers — and persons using agricultural pesticides to obtain recognised certificates of competence unless they are working under the direct and personal supervision of a certificate holder.

Aerial Spraying

Schedule 4 relates to aerial applications. This provides that no one can apply a pesticide from the air unless holding an aerial application certificate granted by the Civil Aviation Authority. These controls come into force on 6 October 1986 and, in more detail, impose:

- requirements to give advance notification to the Nature Conservancy Council, water authorities, the Chief Environmental Health Officer, neighbours, hospitals, schools or other institutions and to any local bee-keepers who belong to a spray warning scheme;
- requirements to warn passers-by, to spray in appropriate wind conditions, and where necessary to provide ground-markers to communicate with the pilot;
- an obligation to keep detailed records and send annual summaries of them to Ministers:
- requirements on the pilot to keep safe distances away from houses, gardens and roads and to confine the pesticides to the land which he or she intends to treat.

NSCA Comment

The NSCA is pleased with the requirement to notify in advance the Chief Environmental Health Officer of the relevant area, as well as all others who might be affected by aerial spraying, but regrets the non-inclusion of specific enforcement powers for local authority environmental health officers. It will be most important to monitor the implementation of the Regulations during 1987, and the NSCA would be pleased to receive details from local authorities about aerial spraying applications in their area and the operation of the regulations: specifically, whether local authorities are confident that Chief Environmental Health Officers are being informed in advance of intent to spray from the air, and whether aerial spraying operations give rise to any problems.

Release of Information

Regulation 7 provides Ministers with powers to seize and dispose of pesticides and Regulation 8 deals with disclosure of information, enabling Ministers to provide an evaluation of an approved pesticide to anyone who requests it. In certain circumstances the original study report or other data submitted in support of an application for an approval may also be provided although people will be forbidden to make commercial use of the information so obtained or to publish it unless authorised in writing.

Consultation on Code of Practice

MAFF has issued for consultation a *Draft Code of Practice on the Agricultural and Horticultural Use of Pesticides.* Comments are required by 31 October 1986. The Code is intended to provide guidance to farmers, farmworkers and others engaged in the use of pesticides approved for use in the agricultural and horticultural industry on how to meet the requirements of the Control of Pesticides

Regulations 1986. The Code covers the following areas: operator training; storage and transport of pesticides on the farm; pesticide use; disposal of surplus pesticide products and empty containers; record keeping; and medical advice. Although specific advice for aerial spraying operators is given in the CAA booklet, *CAP 414 – information on requirements to be met by applicants and holders of the aerial application certificate,* the Code does give advice on the aerial application of pesticides covering features such as the measurement of windspeed, prevention of drift and advance warning of operations. One omission is guidance on the requirement to contact the Chief Environmental Health Officer to give advance warning of aerial spray operations!

ASBESTOS: NATLAS ACCREDITATION FOR LABORATORIES

The Health and Safety Executive are in the process of implementing control over laboratories performing work in the field of asbestos removal, via NATLAS (the National Testing Laboratory Accreditation Scheme). There are currently 16 laboratories in the UK which have been accredited for the counting of respirable asbestos fibres on membrane filters by the standard techniques (Guidance Note EH10). Once granted the coveted right to display the NATLAS logo and accreditation number on the letterhead, the laboratories are in effect quality assured, since any organisation using the name NATLAS must comply with the rules of the scheme and maintain the high standards expected. NATLAS is not a trade organisation, but is a quality control of laboratories administered from the National Physical Laboratory, Teddington.

However, although the NATLAS scheme provides hope for the future in terms of a guaranteed standard of performance, there are currently no controls over laboratories performing clearance sampling after removal. Although in 1984 the Health and Safety Executive recommended that all laboratories working with asbestos should seek NATLAS accreditation, this is not a mandatory requirement.

McCrone Research, as a NATLAS laboratory, is concerned that some of the air sampling carried out for asbestos removal contracts is performed sub-standard fashion by laboratories that are not NATLAS accredited. McCrone's expert consultant, Jean Prentice, has pointed out that when laboratories have not performed their task adequately, the risk of excess death is heightened.

While the asbestos removal contractor usually bears the brunt of the criticism when inadequate work is discovered, often a laboratory has already cleared the area and the criticism is misplaced. McCrone's believe that the asbestos removal contractor can only be accused of following the lead of his employers who wish to cut costs. If he gets cheap and unreliable laboratory clearances he will never know the potential havoc being wrought on the lives of follow-on trades, such as the other contractors who move in after asbestos fireproofing sprays have been removed in order to apply non-asbestos sprayed fireproofing. Some of these follow-on contractors have reported seeing "white powder" blowing back in their faces on some sites and McCrone's have refused to perform clearance sampling when large amounts of visible debris have been present, after other laboratories employed by contractors have passed the areas as containing less than 0.01 f/ml. McCrone have called for more to be done to protect health and safety, and for laboratories to be made accountable under law for the accuracy of their clearances.

CONCERN OVER ASBESTOS IN PUBLIC BUILDINGS

The Asbestos Removal Contractors Association (ARCA) has blamed government for delaying removal of asbestos in publicly-owned buildings because of cuts in local authority budgets. ARCA says that it has on file many instances of council estates and public buildings, such as schools, hospitals, swimming baths and libraries, with acknowledged potential asbestos contamination problems which remain unresolved due to lack of local government funds.

GUIDANCE ON ASBESTOS HAZARDS

The National Society for Clean Air has published a citizen's guide to asbestos, concentrating on asbestos in the home, in the form of a six page leaflet which is available for bulk distribution by local authorities, with individual copies free of charge to members of the public.

The leaflet attempts to set the health risks in perspective, while emphasising the need for great care to be taken in dealing with asbestos materials. The message, **"Consult your local Environmental Health Department for advice and help"** is a major theme. In brief, the leaflet's message is:

- asbestos is dangerous, but not if it is in good condition and left alone;
- don't hesitate to contact your local council's Environmental Health Department for advice and help;
- if in doubt about whether your home contains asbestos or what action you should take, contact your local council;
- don't DIY without advice;
- don't put asbestos waste in the dustbin.

For bulk purchases, the leaflet (*"Asbestos – A Citizen's Guide"*) is available at the usual NSCA rate of £3.40 per hundred or £21.50 per thousand. Orders in excess of 5000 attract a 10% discount.

DUSTY DEFINITIONS

The Advisory Committee on Toxic Substances has recommended that very fine dust particles – less than 5 micrometres in diameter – should be termed "respirable dust". It has also recommended the introduction of a new term, "total inhalable dust", to cover that major portion of dust in the atmosphere which can be breathed in through the nose and mouth. The smaller, respirable dust is that which can be breathed right down into the gas exchange regions of the lungs.

LINKS FORGED BETWEEN NSCA AND FILTRATION SOCIETY

On the initiative of Dr. Ray Allen, Chairman of the Filtration Society, links are being forged between the NSCA and the Filtration Society. Eventually, it is hoped to secure mutual representation on each other's governing bodies and close exchange of views, including reciprocal representation at meetings and congresses held by the two bodies.

The Filtration Society was formed in London in 1964 and is a charitable, non-profit making organisation, established to advance knowledge in the design and use of filtration and separation techniques in all industries. Membership is open to any individual, particularly those working for manufacturers and users of filtration technology, universities and research organisations. There are members in more than 20 countries around the world and chapters or groups in 12 countries.

The next World Filtration Congress will take place in Nice, France, 5-8 June 1990, and regular international and national meetings are held between the world congresses.

TIDY AWARD FOR NSCA PRESIDENT

Councillor Len Poole, BEM, JP, President of the Society, has been presented with one of the Queen Mother's Birthday Awards for 1986, through which the Keep Britain Tidy Group has recognised his outstanding public service, particularly in the field of environmental improvement and pollution control.

Len Poole is currently a member of the National Executive of KPTG and Vice Chairman of the Tidy North Committee and of course is Chairman of the Middlesborough BC Environmental Health Committee which oversees the work of the Tidy Up Middlesborough public action campaign.

ACID RAIN INFORMATION CENTRE

The former Greater Manchester Council's Acid Rain Information Centre has been given new life with external funding by the district councils of Greater Manchester and with incorporation into the Department of Environmental and Geographical Studies in Manchester Polytechnic. The Centre, originally charged with investigating rainfall acidity in Greater Manchester and providing an information and educational service, quickly developed special expertise in the design and execution of acid deposition monitoring and interpretation of data. They have carried out both a short survey within the Greater Manchester area and a long term study which became operational in March 1986 when a network of 78 schools began collecting rainfall samples and measuring pH values. Chemical analysis of these samples is performed by the Greater Manchester Scientific Services Laboratory (formerly the County Laboratory); a corrosion study using zinc cans, and measurements of nitrogen oxide in the atmosphere, are also carried out at the same sites.

ARIC now has one of the largest specialist collections of books, reports and papers on acid deposition and its effects, collected from British, Scandinavian, American and European sources. All this material is available for use by visitors to the Centre and reports and papers produced by ARIC and a publications list is available on request. The National Society for Clean Air is one of the bodies providing free literature to ARIC, and ARIC has recently joined the Society as a specialist corporate member.

ARIC is supported by Tameside MBC on behalf of the district councils of Greater Manchester. Further information is available from: Dr. Jim Longhurst, Director, ARIC, telephone: 061-228 6171

NOISE NUISANCE FINES

A building company, Design and Construct Limited of East Ham, was fined £1200 plus £100 costs for carrying out noisy building work outside hours specified by the EHOs of the LB of Hammersmith and Fulham. After the case was heard at Waltham Street Magistrates Court in July, the council's spokesperson said that, "The noise was considerable and unacceptable to residents in the neighbourhood". The Company were converting a house into flats and using power tools and hammers on Saturday afternoons and Sundays, contrary to a Notice served by the council.

In another successful prosecution brought by the same London Borough, an individual was fined £75 plus £25 costs after being found guilty of causing a noise nuisance under the Control of Pollution Act 1974. The lady in question had held a 3-day party at her flat for which she had hired a DJ and music system and had issued tickets advertising the event.

NOISE CONTROL — NEW BRITISH STANDARD

BSI has issued a specification for integrating averaging sound level meters (BS 6698). The standard deals with integrating sound level meters of four degrees of accuracy — Types 0, 1, 2 and 3. Type 0 is intended for use as a laboratory reference standard, Type 1 is intended both for laboratory and field use, where the acoustical environment can be closely specified and/or controlled; Type 2 is suitable for general field classifications and Type 3 is intended primarily for field noise surveys. The integrating sound level meter is well suited for measurement of the equivalent continuous sound pressure level of impulsive sounds which have high peak amplitude and duration as short as 1 m/s. Typical applications are for measurement of industrial noise, community noise, and average sound pressure level around a noisy product or other sound source.

Copies of BS 6698 are obtainable from: Sales Department, BSI, Linford Wood, Milton Keynes, MK14 6LE. Price: £31.00 (£12.40 to BSI subscribing members).

EEC LEAD IN PAINT PROPOSALS "INADEQUATE"

DOE Minister William Waldegrave has described European Community efforts to encourage lead-free paint in Europe as inadequate. The Commission is proposing a Directive which will lower the threshold for warning labels to appear on paint tins, from 0.5% lead in the liquid, to 0.25%. However, the British government and the British paint industry are now convinced that it is no longer necessary to add lead to paint for normal household use and under a voluntary agreement reached in February 1985 lead has ceased to be added to white decorative paint and will cease to be added to coloured decorative paint from 1 July 1987. Where appropriate, paint tins will carry the label "contains no added lead". This agreement will cover approximately 90% of paint manufactured within the UK, by member companies of the Paint Makers Association of Great Britain Limited. However, the agreement does not cover imported paint where the labelling needs only to conform with EC Directive.

NEW INITIATIVES ON UNLEADED PETROL

The Department of the Environment has announced a series of measures to encourage the widespread introduction of unleaded petrol in the UK ahead of the European Community target date of 1989.

These measures include definite dates from which new cars must be capable of running on lead free petrol, providing agreement is reached within the EEC (1 October 1988 for new model cars over 2 litres; 1 October 1989 for all new model cars; and 1 October 1990 for all new registrations unless a manufacturer certifies that major re-engineering would be involved).

DOE is also to discuss with industry how a minimum network of garages selling unleaded petrol can be provided by October 1987, with a wider network by October 1989. In addition, there will be a publicity campaign to inform the motorist about unleaded petrol, its availability and its suitability for particular cars. Finally DOE is to hold talks on the most appropriate timing for phasing out 2-star leaded petrol, to make room at garages for the unleaded pumps.

These measures follow a decision already announced in the Budget to create a tax differential between leaded and unleaded petrol to offset the higher production cost of the unleaded petrol. This differential is expected to be introduced in the 1987 Budget.

Meanwhile, Texaco are offering an information service for motorists. To find out whether your car will run on lead-free petrol, dial 100 and ask for FREEPHONE 2793.

CONTROL OF GASEOUS EMISSIONS FROM PETROL ENGINES

With the exception of a reservation by Denmark, a near agreement on further control of gaseous emissions from petrol engined vehicles has been reached within the EEC. As envisaged, the Directive would have the equivalent effect on the European Environment as current US standards, although its provisions would be capable of being met by a variety of technologies, including simple lean-burn techniques. The proposal, if agreed, should achieve a reduction in NOx emissions of approximately 48% by the time it is implemented in full. However, William Waldegrave, in his capacity as current head of EEC Environment Ministers, recently failed to persuade the Danes to withdraw their objection — made because of Denmark's perception of the need for more stringent standards than those currently on the table.

DIESEL EXHAUST STANDARDS

The European Commission has proposed stricter exhaust standards to cut gaseous emissions from diesel vehicles. The scheme, if approved, would come into effect at the beginning of 1988 for new model engines.

The reductions proposed for commercial vehicles are 20% for CO and NOx, and 30% for HC. Taking into account the different test procedures, this should bring European values down to a level virtually equivalent to those currently in force in the United States for the same class of vehicle. The limits can be met by use of current technology and would apply to new model engines 18 months after the directive is adopted.

RADIOACTIVE WASTE MANAGEMENT – 7th RWMAC REPORT

The Radioactive Waste Management Advisory Committee has published its 7th Annual Report, in which it has welcomed the progress made during 1986 in investigating suitable NIREX sites for disposal of low-level radioactive waste. The 7th report also covers RWMAC's response to the House of Commons Environment Committee's report on radioactive waste. In summary, this welcomed: the Select Committee's recognition of the very limited size of the problem; its conviction that safe disposal routes are available in the UK and that indefinite storage presents unacceptable risks; its acceptance of near-surface disposal for short-lived low-level wastes; and the clear appreciation of the degree to which the UK is lagging behind other leading countries such as Sweden, USA and Germany in its waste disposal programme.

Other subjects covered in the 7th RWMAC report are sea disposal, the DOE's published study of the best practicable environmental options for low and intermediate-level waste; the UK research programme; the current state of the review of intermediate-level waste conditioning and containment; the Drigg Disposal Site in Cumbria; and a report of the Committee's visit to radioactive waste sites in Sweden. The report also contains, as an appendix, an industry viewpoint under the heading "The Technical Questions in Perspective".

With some reservations RWMAC supports sea disposal for Magnox ion exchange resins, plutonium contaminated materials and other special categories of radioactive wastes. This report makes a clear recommendation that material already packaged for dumping should be disposed of at sea. The Committee's chairman, Professor Paul Matthews, called the obstacles not technical, but purely political. Professor Matthews also emphasised, as both government and industry are keen to do nowadays, the importance of getting more facts on radioactivity across to the public. At the report's press launch he said that a major problem was that public concern seemed so out of proportion with the actual risks. He also blamed the attitude of the media for the lack of accurate information reaching the public and said that if the press and media were determined to get the message across in a "cold blooded and rational" manner, then the situation would rapidly change.

LIVING WITH RADIATION

The National Radiological Protection Board has published a new edition of the booklet, *Living with Radiation.* This contains completely new chapters on nuclear reactors and waste management but, as with the earlier 1973 and 1981 editions, the main objectives are to indicate the nature of ionising radiation, its sources and effects and the means of protecting people against it. The scope of information ranges from everyday exposure to background radiation, through to the plans for dealing with a serious accident.

In the light of the Chernobyl experience, which illustrated the importance of telling the public about radioactivity and radiation, the Board hopes to make available more facts to the public; this revised booklet is just one step in that programme.

NSCA STUDY INTO CIVIL NUCLEAR POWER

In the light of the growing public interest in and concern about the issues surrounding civil nuclear power, the NSCA has established a working group to review technical and organisational matters central to the safe generation of nuclear power and the disposal of the hazardous materials it creates; we shall also be looking at the political, social and ethical questions surrounding its employment.

HAZARDOUS BUILDING MATERIALS

An important new publication offers housebuilders, property developers and local authorities guidance on the selection and use of materials in order to avoid hazards to health and the environment.

The book was commissioned by Godfrey Bradman, Chairman of the property company Rosehaugh PLC, who wished to draw together in one publication the accumulated knowledge in different disciplines to help in the selection and evaluation of more safe and suitable building materials.

The editors, an architect and a construction manager, both lecturers in the Department of Civil Engineering, University of Salford, have brought together leading authorities from medicine, toxicology, occupational health and environmental science as contributors. This expert advice is linked with the editors' own expertise in building technology and current industry practice to ensure a practical, down to earth approach.

The problem for the building designer is to select materials which offer the least hazard to health but are still technically and aesthetically satisfactory and remain within sensible cost limits. The particular value of this guide is that not only does it discuss, in a series of review articles, the hazards to health from materials such as asbestos, manmade mineral fibres, metals, plastics and toxic chemicals, but it offers a wealth of technical detail in the form of building data sheets which give an efficiency and cost comparison of materials for specific applications. These data sheets will be of real practical benefit to everyone concerned to ensure that buildings are environmentally as well as structurally safe.

The publication of this book is most timely in view of the increasing concern about hazards in the indoor environment, and the NSCA is to further this discussion in its 1987 Workshop (25-26 March) which will take as its theme "Indoor Air Quality — Acceptable Standards and Building Design".

Hazardous Building Materials. A Guide to the Selection of Alternatives. Edited by S.R. Curwell and C.G. March. Pub. E. & F.N. Spon (1986)

ONSHORE OIL AND GAS DEVELOPMENT
Nature Conservation Guidelines

The Nature Conservancy Council has published Guidelines for onshore oil and gas development which have been drawn up in consultation with the industry, central and local government and conservation interests. Their purpose is to help ensure that onshore oil and gas resources in Great Britain are developed with minimum impact on the country's nature conservation resource. The NCC found that the existing standard of development is already high and thus the Guidelines are in many respects a codification of current best practice. To date, the environmental impact of onshore oil and gas development has been small, partly because the industry's land-take is itself small. Moreover, most exploration and production sites are developed on agricultural land, or land of low nature conservation interest.

All the guidelines are fully developed in the 51-page report published by and available from: Nature Conservancy Council, Department OG, Northminster House, Peterborough PE1 1UA.

EEC DIRECTIVE ON PROTECTION OF WORKERS FROM NOISE

On 12 May 1986 the Council of EEC Ministers adopted the Directive on Protection of Workers from Noise. The Directive will apply to all workers except those engaged in sea and air transport, although these, too, may eventually be covered.

The Directive will require general action to reduce risk of hearing damage and specific measures where the daily noise exposure exceeds 85 dB(A), or the peak pressure exceeds 200 pascals. These measures include a requirement for noise assessment and surveys, ear protection to be made available, regular hearing checks, and availability of proper information and training.

More stringent measures are required where the daily noise exposure exceeds 90 dB(A), or peak pressure exceeds 200 pascals. These include the application of a programme of measures to reduce, as far as is reasonably practicable, the noise level in work places and the time workers have to spend in noisy places. In addition, ear protection would have to be used by workers and, where possible, areas where ear protectors must be used would have to delimited, marked with signs and access to them restricted.

The new Directive has been welcomed in this country by Dr. John Cullen, Chairman of the Health and Safety Commission. The Commission will now be taking another look at their own 1981 proposals for noise legislation, with a view to framing fresh proposals on the most effective way of implementing the Directive. The Commission will consult widely before submitting to government its views on the legislation that will be needed.

UK measures to implement the Directive must be effective by the implementation deadline of 1 January 1990.

FGD AUTHORISED FOR UK POWER STATIONS

The UK Government has made two announcements about specific action it intends to take to tackle the problem of acid rain. First, it has stated that future coal-fired power stations will be fitted with scrubbers, or whatever better technology meets the requirements of the Industrial Air Pollution Inspectorate at the time. Secondly, regarding existing plant, the Government has authorised the Central Electricity Generating Board (CEGB) to retrofit 6,000 MW of existing generating capacity with flue gas desulphurisation (FGD) equipment.

Three major power stations are to be retrofitted in a phased programme which will extend from 1988 to 1997. The recently completed "Drax B" power station will be the first; announcements about which other power stations are to be chosen for treatment will depend upon consultations with the local planning authorities and on engineering and scientific studies.

Speaking at a special conference organised jointly in September by the NSCA and IEEP (Institute for European Environmental Policy), Lord Marshall, Chairman of the CEGB, explained that the initiative for the announcement had come from the CEGB itself. Following a fresh scientific understanding of the relationship between sulphur depositions and long-term soil acidity, the CEGB had made a recommendation to the UK Government that enough of CEGB power stations should be retrofitted to ensure that, taking one year with another, sulphur emissions from that source continued to decrease steadily throughout the remainder of the century.

However, the UK commitment is not entirely without strings. The Government has made the proviso that the CEGB's present scientific understanding must be confirmed by the Royal Society and the two Scandinavian academies when they give a first report to the CEGB next year. The programme is also dependent upon the outcome of engineering studies, and some considerable delay might be caused by the need to install pre-scrubbers at the power plants to be fitted with FGD, in order to cope with the high chlorine content of British coal. Although in theory such plant could be installed and working within a year, the current CEGB/DOE time-table suggests that a far more generous engineering trial period of three years is to be allowed – which might strike those abroad who have exerted such pressure on the UK to control gaseous emissions from large combustion plant as overly-cautious progress.

Officially, it is suggested that the measures announced for existing power stations should secure a 14% reduction in sulphur dioxide emissions by 1993, on the basis of 1980 national levels. On the basis of current trends in energy consumption and emissions, this could bring the UK close to, but not necessarily below, the "30% Club" target – which the UK is *not* at present committed to.

New Pollution Control Inspectorate for England and Wales

The UK Government has announced its intention of setting up a new integrated pollution control inspectorate within the Department of the Environment.

This will bring together the Industrial Air Pollution Inspectorate (currently located within the Health and Safety Executive) and other bodies already operating within the DOE, notably the Hazardous Waste Inspectorate and the Radiochemical Inspectorate. The move is intended to secure a co-ordinated approach to controls over industrial emissions and discharges into air, water and on land with a view to developing the "best practicable environmental option" concept. The new "HM Inspectorate of Pollution" will come into being on 1 April 1987 and will have responsibility for pollution control in England and Wales. There is already an equivalent body for Scotland.

Oxidiser unit destroys fumes and saves fuel
New equipment has been installed at the brewery.
The oxidiser unit is expected to produce significant savings in fuel by using a heat exchanger to heat fresh air being draw

Costs reduced dramatically
The new pollution control equipment also consumes 40 per cent less energy than the catalytic
incorporation of a secondary heat recovery system to the fresh air intakes at the roaster burner boxes.

Lowest practical fuel costs
The system contains nearly two and a half miles of tubing making up the heat exchanger – a piece of equip-

positive return on investment
The thermal oxidiser plant has led to
collected more than 99.5 per cent

Payback within months
This incremental cost for the heat exchanger is paid back in approximately one shift year by the savings in fuel costs. If two or three shifts are operating, the payback time is just several months.

POSITIVE EFFECT ON PROFITS
Waste gases are incinerated at high oxidation temperature to clean and remove odour nuisance, recovering the heat value contained in the gases and

Metal Box Air Pollution Control Systems. They help you clean up in more ways than one.

Metal Box thermal oxidisers convert contaminated fumes into clean carbon dioxide and water vapour exhausts which more than meet governmental guidelines.

If you add primary heat recovery you will find savings impressive. If you feed secondary heat recovery back into your process, to generate steam for example, you'll find a real payback with a return on investment.

These top-selling systems from Smith Environmental Corporation are made under licence by Metal Box who are set up specifically to help manufacturers, using solvents in furniture, chemicals, paint, printing and many other industries. They engineer a complete system and take the headache out of major projects of this sort.

Try them for anything. Because the combination of Smith's energy-saving technology and Metal Box's engineering and servicing skills makes these systems potentially the most profitable in the business.

If you want to clean up in more ways than one, call Metal Box.

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Reader Enquiry Service No. 8634

INDUSTRIAL NEWS

CLEAN AIR EXHIBITOR – BLACKPOOL '86

Setting the standard in reliable, low maintenance, emission monitoring and control continues to be the theme for ERWIN SICK at the NSCA Exhibition. Efficient process control and compliance with the environmental safety laws are jointly afforded by the company's range of continuous, cross-stack optical instruments which include the popular RM41 dust density monitor adopted by the electrical power, cement and chemical industries; the RM61 dust density monitor now widely used for monitoring the viability of bag filters or for checking emission from small incinerator plants; and the GM21 SO2 combined dust concentration measuring system which offers the significant advantage of being successfully operable in the presence of water vapour or other interferents such as CO.

Taking pride of place will be the latest addition to the ERWIN SICK range, the MR3 data logger which is specifically designed to monitor combustion processes and takes the output from 4-24 emission monitors, providing a centralised reference and analysis point. The MR3 is programmable to give a broad variety of information including mean averages, peak values, computed functions etc., and may be formatted to meet the monitoring requirements of the proposed EEC Directives.

The logger is designed to conform with the exacting TUV standard and is ideal for use with SICK's proven RM41 monitor and GM21 SO2 dust concentration measuring systems, but can also process measurements from other devices with inputs from 1 to 20mA, without adaptation.

Suitable for monitoring furnace waste incinerators etc., the low cost RM61 determines smoke density by optically measuring the energy loss sustained by a focussed beam of light, as it passes through a gaseous medium containing solid particles. The device is also very useful for process control functions providing both environmental protection and evaluation of process efficiency.

Responding to the demands for superior sulphur monitoring methods, ERWIN SICK has introduced the GM21 gas concentration and measuring equipment. The instrument, which acts as a UV spectrophotometer, provides full compliance with environmental legislation and features the reliability and low maintenance expected of ERWIN SICK equipment. It is successfully used in a variety of industries including power stations, cement industries, refuse incinerating plants, refineries and sugar factories etc.

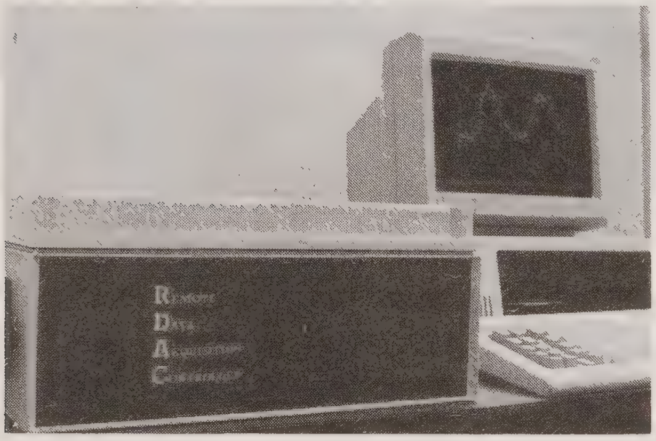
Reader Enquiry Service No. 8635

BES Environmental Monitoring Systems

The Department of the Environment has recently selected the BES system for the United Kingdom Ambient Monitoring

Network, being established by the Warren Spring Laboratory. Also, as a result of a joint programme with the Duke of Grafton's committee, the Central Electricity Generating Board are establishing major monitoring networks.

The BES Environmental Monitoring System allows retrieval of information at a central point, which may be collected using a wide range of sensing devices monitoring parameters in the environment.



Many other organisations in all industrial sectors are considering environmental monitoring, where they need to be certain they are operating safely and efficiently.

The BES Environmental Monitoring System can be a simple dedicated unit on one site, or used as a fully automated modular network using the public switched telephone system, thus enabling a reliable and accurate means of collecting and interpreting useful information from monitored parameters. This highly configurable system gives a common interface between a wide range of sensing devices and is able to present such parameters automatically at a central point. This has been a key factor in the selection of the BES system for many varied applications.

The philosophy of allowing the end users to configure the system to monitor various parameters, raise alarms and extract relevant data has proved to be a very useful feature.

New and more advanced systems are currently being researched and developed by BES, so that systems are available to meet the increasingly sophisticated monitoring requirements.

Reader Enquiry Service No. 8636

Electronic Control of Flue Gas Scrubber Unit

An interesting example of the way in which electronic control can be applied to the vital process of emission control in flue and fume extraction has been demonstrated by Reliance Electric (UK) Limited of Telford in Shropshire.

The application in question was undertaken by the company's American parent in Cleveland, Ohio and features a flue gas desulphurisation unit at Springfield City Utilities South West Power Station.

This 196 megawatt coal-fired station provides electricity to the city of Springfield together with a surplus for re-sale on the American grid system equivalent. Designed to burn Oklahoma/ Kansas high sulphur coal, the station uses an electrostatic precipitator and wet limestone scrubber to remove fly ash particles and sulphur dioxide from the flue gas.

The scrubber unit operation involves forcing flue gas from the boiler furnace through an absorber unit in the scrubber chamber using induced draught fans. The absorber unit comprises two perforated stainless steel diffusion trays through which a limestone slurry is sprayed. The slurry spray is created by grinding crushed limestone and adding a dibasic acid as needed.

A chemical reaction takes place between the flue gas and the limestone slurry which removes approximately 86-90% of the sulphur from the gas along with the fly ash particles present. In addition, the gas is cooled from approximately 350°F to 150°F as it passes through the presaturation chamber.

The end result is a calcium sulphate and calcium sulphite sludge which is pumped to a thickener tank for further processing. Additional fly ash is then mixed with this sludge and the resultant mix is transported to a landfill site nearby. The residual portion of the limestone/ dibasic acid left in the holding tank is recycled back to the spraying area.

The cleaned and environmentally acceptable flue gas which remains is exhausted to the atmosphere through the plant's 385ft. high chimney stack.

For a little over 12 months, the Springfield scrubber unit has been controlled by a Reliance Automate 30 programmable controller which replaced a first generation PC. The Automate 30 currently uses 206 I/O points and is primarily responsible for the operation of pumps, inlet and outlet dampers, unit timing and an alarm system. The Automate also handles motor starting for the limestone grinding operation which takes place in two grinding ball mills.

Reader Enquiry Service No. 8637

Dust Control at Braithwaite Plastics

Braithwaite Plastics is the world prime producer of a virtually indestructable board manufactured from plastic waste, thereby not only helping to keep Britain tidy but also producing a very useful product, with a host of applications from farming to protecting electric cables, both at home and abroad.

The product is trimmed and cut to length as it is delivered from the continuous production process. This results in the generation of copious quantities of dust. Where better to look for the answer to this problem than Braithwaite Filters Ltd., a sister company in the Braithwaite Group PLC.

After studying the problem, a specification was agreed using a Braithwaite continuously rated filter and a 60 HP motor driven Halifax backward inclined fan entraining 26000 m^3/hr. The connections to the multiple gang saws are particularly interesting in that they have to accommodate extensive variation in saw positions and extraction was needed both above and below the saws.

The Braithwaite Filter has three rows of pad shaped filter elements mounted vertically above each other and 20% of the filter is cleaned automatically at any one time by high pressure compressed air under conditions of no filtered air flow. This advanced off-line cleaning is very effective in controlling filter; resistance under heavy surge dust loads.

Collected dust is discharged from the filter through a screw conveyor and rotary valve. Because of the potentially explosive nature of the fine dust the filter is protected by an explosion release vent direct to atmosphere.

Reader Enquiry Service No. 8638

So nice to come home to-

a warm welcoming 'COALITE' fire

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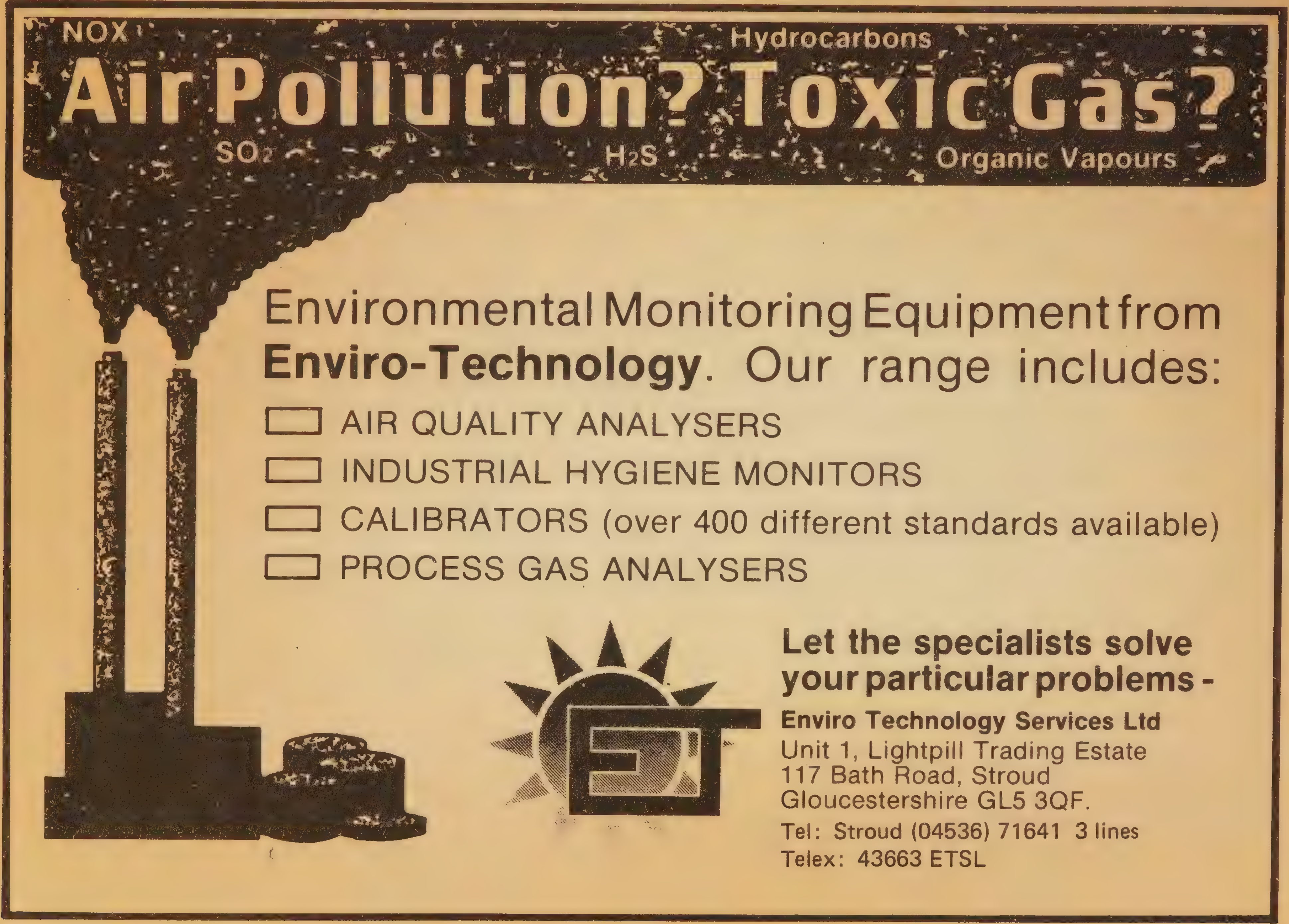
Reader Enquiry Service No. 8624



NOX Hydrocarbons

Air Pollution? Toxic Gas?

SO_2 H_2S Organic Vapours

Environmental Monitoring Equipment from **Enviro-Technology**. Our range includes:

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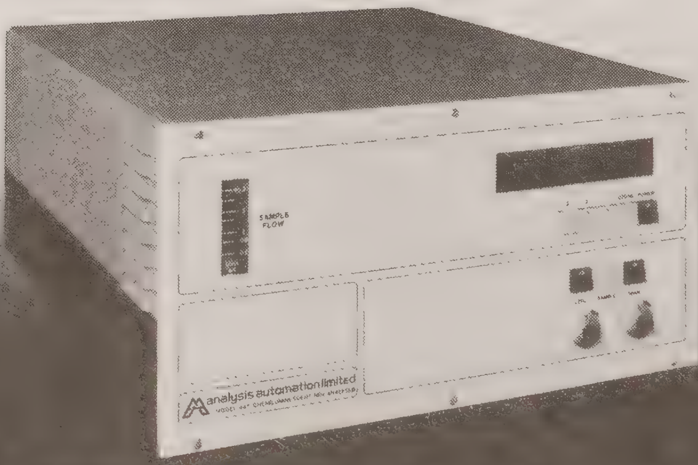
Reader Enquiry Service No. 8625

CLEAN AIR

1986

VOL.16 NO.4

Monitors that measure up.



Analysis Automation have introduced a complete new range of analysers for the measurement of ambient air pollutants.

The instruments are the first of their kind to be manufactured in the United Kingdom.

Together, they meet the total current requirement for state-of-the-art monitoring for ambient levels of SO_2, NO/NO_2, CO and Ozone.

Model 407 GFC CO analyser. Model 427 U.V. Ozone analyser.
Model 447 Chemiluminescence NOx analyser. Model 477 Pulsed Fluorescence SO_2 analyser.

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Reader Enquiry Service No. 8639

CLEAN AIR

THE JOURNAL OF THE NATIONAL SOCIETY FOR CLEAN AIR

VOL. 16, No. 4 ISSN 0300-5743 1986

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CLEAN AIR is printed and published quarterly (1986) by the National Society for Clean Air at 136 North Street, Brighton BN1 1RG. Tel: Brighton (0273) 26313.
Publishing Director: Air Commodore J. Langston, CBE, FBIM, Secretary General.
Editor: Jane Dunmore.
Advertising: Peter Mitchell.
Issued gratis to Members and Representatives of Members.
1986 subscription rate for CLEAN AIR – £11.95 post free. Advertising Rates available on application.
CLEAN AIR is the official journal of the Society, but the views expressed in contributed articles are not necessarily endorsed by the Society. Abstraction and quotation of matter are permitted, except where stated, provided that due acknowledgements, including the name and address of the Society are made. Technical articles of full page length, or over, in CLEAN AIR are indexed in Current Technology Index. Abstracts are included in Environmental Periodicals Bibliography (EPB).

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ENVIRONMENT PROTECTION

The Anacon 306 Dust Monitor developed and built exclusively under licence from Unilever provides an inexpensive method of monitoring dust levels in ducts or stacks.

One of the major applications of the instrument is to warn when there are abnormal dust levels, indicating a drop in filter efficiency, and therefore a potentially dangerous dust discharge to atmosphere.

The Dust Monitor is extensively used for monitoring the efficiency of dust extraction systems used in industries where production processes produce dusty atmospheres.

Features include low installation and maintenance costs, an adjustable alarm for increasing dust levels, an alarm for detection of short term increases in dust levels, a warning of instrument malfunction and the rugged weatherproof design allows for outdoor location.

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Reader Enquiry Service No. 8642

Costs reduced dramatically
The new pollution control equipment also consumes 40 per cent less energy
incorporation of a secondary heat recovery system to the fresh air intakes at the roaster burner boxes.
Oxidiser unit destroys fumes and saves fuel
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Try them for anything. Because the combination of Smith's energy-saving technology and Metal Box's engineering and servicing skills makes these systems potentially the most profitable in the business.

If you want to clean up in more ways than one, call Metal Box.

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Reader Enquiry Service No. 8643

REPLENISHING THE ARMOURY

The Society's long campaign to move the Industrial Air Pollution Inspectorate from HSE to the Department of the Environment finally paid off when the Government announced that this transfer would be effected as part of the formation of a new combined Inspectorate of Pollution. BUT – we have won a battle, NOT the war. To date, no more than the outline of the new Inspectorate and other changes within the DOE have been given. We await with interest, and some concern, official news on details such as staffing levels, overall direction and specific functions of the new body. Agency agreements with HSE require resolution and local authorities *must* be satisfied that they can maintain and build on working relations established with present incarnations of central agencies.

In the short term, the new Inspectorate will probably have to content itself with operating separate legislation governing emissions to, or impact upon, different media. But in the longer term, the NSCA believes that development of the 'best practicable environmental option' (BPEO) concept will demand additional or alternative legislation, capable of practicable application at the planning and operational stages, and capable of being tested in the Courts. The NSCA is convinced, too, that local authority environmental health officers should have equivalent enforcement status, and that the successful application of BPEO-directed legislation will depend critically upon the relationship between central government, the new HMIP, and the local authorities.

But first there are some vital questions to be resolved before the Government's decision to look at environmental questions in the round can be successfully implemented. It will be essential to ensure the independence of the new Inspectorate of Pollution. It may welcome advice and input at many levels on how best to achieve its targets, but it should be free of excessive bureaucratic or political control. The Inspectorate must be properly staffed – and the current IAPI has problems in recruiting staff at the salaries offered, because the well-qualified people suitable for IAPI posts can earn much more within industry. The appointment of Chief Inspector for the new Inspectorate has yet to be made, but it should be a professional, and someone acceptable to industry, the local authorities, and all the environmentally interested parties. Finally, the structure of the new Inspectorate should be such as to ensure close integration of the various concerns now separately represented by IAPI, HWI, the Radiochemical Inspectorate and an as yet to be formed Water Inspectorate. And a particular concern for the NSCA is that the air pollution control function should not be submerged or diverted, and should at all times be properly resourced, both in the field (with adequate sampling teams) and at divisional and HQ levels.

KEYNOTE SPEECH
By
Dr. M.W. Holdgate
made at the
53rd CONFERENCE OF THE NATIONAL SOCIETY FOR CLEAN AIR
27 October 1986 in Blackpool

Introduction

Mr Chairman, Mr President, Mr Mayor, ladies and gentlemen, my first duty is to convey my Ministers' apologies that pressures of Parliamentary and European Community Presidency business make it impossible for one of them to be here tonight to participate in this opening of your 53rd Conference. But speaking as one raised in this town, I am delighted that their enforced absence has given me the chance to come to Blackpool tonight and join in your proceedings. Your programme for the next three days makes it clear that you are in for a lively and informative discussion, touching on many of the central issues that will concern practitioners in the field of air pollution control over the next few years.

Review of air pollution control legislation

Tomorrow morning you will be considering possible changes in the United Kingdom's air pollution control system, and Commissioner Clinton Davis will be giving you a European perspective. The Government has for some time been considering how the British control system should be developed. We hope to issue a consultation paper before Christmas.

That paper will address some of the important issues to be discussed tomorrow morning by two of your speakers. I would like to mention three of them.

First, I would like to reassure you that we will continue to stand by the familiar UK principle of best practicable means, but we will be looking at the scope of its application. This system is not used (or always understood) by our continental neighbours in the Community but it does offer a number of special advantages. It offers control over a whole process. It is flexible and has regard to the state of technical knowledge, to financial implications and to local conditions and circumstances. And — I think we should not undervalue this point — it is familiar to industry and to the control authorities and has a proven record of success.

Secondly, we will need to look at the implications for our own system of control of the European Community "Framework" Directive on combating industrial air pollution. The Directive covers a somewhat wider range of processes than are currently "scheduled" by the Industrial Air Pollution Inspectorate, including some that are now controlled at the local level. Local control has many advantages. We have hitherto restricted the processes for which the IAPI is responsible to those that really require their specialist attention because of technical complexity or high pollution potential. Othewise, we have regarded industrial air pollution as a matter appropriate for local control. We will clearly have to look at how prior control should be extended beyond the current scheduled processes and how the work of the IAPI and local agencies can reinforce one another most effectively.

My third topic is the question of "openness on environmental matters". Many of you will remember the Royal Commission on Environmental Pollution's recommendation in their 10th Report that there should be unrestricted access to information which the pollution control authorities obtain through their statutory powers. In response to this proposal the Government set up a working party. Its report, "Public Access to Environmental Information", was published by HMSO in April as Pollution Paper No 23. That report lists a number of ways in which the public had already been given greater access to environmental information since the Royal Commission had published their report. But there are still more things that can be done. The Report therefore recommended further changes in law and in administrative guidance to meet the Royal Commission's principal recommendations.

The Government accepted the broad thrust of the report and the process of detailed consultation has begun. Local authorities will of course have a part to play. The Local Government (Access to Information) Act 1985, which as you know came into force in April this year, can be expected to result in greater openness in the pollution control activities of local authorities, especially in relation to air pollution and waste disposal. But we hope that industry too will recognise the advantages, in terms of public confidence, of making information more readily available. As William Waldegrave said in the Federal Republic of Germany in September 1985, "Secrecy benefits nobody. It cannot be in industry's interests to hide information which does not need to be hidden. The public are bound to think the worst."

HMIP

I have already mentioned the Industrial Air Pollution Inspectorate. Recently the Government announced that a new unified Inspectorate will come into being on 1 April next year. Her Majesty's Inspectorate of Pollution will continue to carry out the functions of its constituent Inspectorates — the Industrial Air Pollution Inspectorate, the Radiochemical Inspectorate, the Hazardous Waste Inspectorate and a new Water Inspectorate. But I believe it will soon become clear that the new body is greater than the sum of its parts. There is much to be done in developing a more coherent approach to the control of polluting emissions.

Many industrial processes may offer little choice as to the form their wastes take or the medium to which they must go. But there are occasions when a choice *is* available. In the past we have not been well organised to assess which process or which disposal route constitutes the best practicable environmental option. But I believe that we have now set the scene for public consideration of BPEO, and that the new Inspectorate will have a significant role to play in developing the concept and as a centre of expertise which will be of considerable value to other control authorities.

Acid rain

I would like tonight to refer also to another recent Government announcement, made on the 17 September, that featured strongly in the lively seminar on acid rain that your Society organised in London on 19 September in partnership with the Institute for European Environmental Policy.

On 11 September my Secretary of State said that the Government had now authorised the CEGB to retrofit 3 major power stations, some 6,000 MW of generating capacity, with flue gas desulphurisation equipment. Subject to satisfactory design processes and final approvals, the programme will start at Drax B, and be phased over the period between 1988 and 1997. It is estimated to cost some £600 million. We have also announced that all future coal-fired electricity generating stations will be fitted with this – or equally acid free – technology. This will keep the trend in British sulphur emissions – which have already fallen more from their peak in the early 1970s than those of most European nations – in the right direction – downwards. It will keep us on course to achieve our stated aim of a 30% reduction in emissions from the 1980 levels by the end of the 1990s. It may even enable us to do better – but that depends on future energy scenarios, which remain uncertain.

Vehicle emissions

As scientists have begun to probe the causes of the devastating die-back in the forests of Germany, Switzerland, Sweden, Austria and other countries, suspicion has become focussed on secondary air pollutants, especially ozone. And this in turn has brought increasing attention to the hydrocarbons and nitrogen oxides released by vehicles. The UK is one of the countries that led in the negotiation of the package of measures agreed by all except 2 members of the European Community. We hope that package will soon be accepted formally.

Meanwhile, we have taken steps to deal with another notorious pollutant from motor cars – lead. From the beginning of this year, the lead content of leaded petrol – needed by most cars on our roads today – was reduced by two thirds. And we are also well on target to make unleaded petrol widely available throughout the United Kingdom. Since June it has been on sale at nearly 200 filling stations. The oil industry is clearly responding to the challenge and is taking an active part in the public information exercise that will be necessary if this new fuel is to be used properly. I am sure that the car manufacturing industry – which has already devoted much effort to the development of lean burn engines to reduce pollution – will play its part.

Research programme

The Government believes that environmental protection policies must be based on sound scientific research. My Department is spending over £4 million a year in studies of air pollution and acid deposition. Our programme covers the whole pathway from emissions to targets. It takes into account chemical transformations in the atmosphere and transport and deposition mechanisms. We have greatly expanded our efforts in monitoring and compiling emission inventories for those pollutants that are known to make a major contribution to acidity in the environment – sulphur dioxide and nitrogen dioxide – or to be implicated in damage to trees and plants – ozone. I note that you will be hearing much more about these on Thursday afternoon. We now have in place networks for monitoring acid deposition in the UK and are setting up others to measure nitrogen oxides and ozone and rural levels of sulphur dioxide. These will provide us with a much better picture of air pollution and acid deposition in the UK.

We are continuing to give high priority to research on effects on crops, trees and vegetation – and particularly on the impact of acid deposition on freshwater quality and eco-systems. We are funding a number of studies of freshwater catchments, because we recognise the importance of the interaction between acid deposition, water and soil chemistry, and land management practices. Data from these studies are now being used to develop models, which can be applied to investigate the impact of different emission control strategies and to assess the sensitivity of processes affecting acidification.

The Select Committee on the Environment, in their report on acid rain, criticised the Government for not supporting enough research on the effects of acid deposition on historic buildings. In response, work has been intensified, especially by the Department's Building Research Establishment. We are studying in particular the effects on Lincoln and Wells Cathedrals and Bolsover Castle. We have also included in the programme some engineering and economic assessments of control technologies.

Such research needs to be evaluated before we can move to new action. I would like in this connection to pay tribute to the independent expert groups we have established to examine key aspects of the acid deposition problem. Reports by the Acid Rain and Acid Water Review Groups have already been published and other Groups'reports are expected before the end of the year. I commend them all to you.

Noise

On Thursday morning the Society will be considering noise. I would like to emphasise that the Government's concern to bring noise under control remains undiminished. I am sure that most people will recognise that in a country as densely populated as ours this is by no means an easy task. As the papers to be presented on Thursday show, we need to seek the reduction of noise at source, protection from excessive noise, and the encouragement of consideration for others. The proposed teaching pack, and other publicity produced by the Society, is important here.

How can Government help? First, by the implementation of the measures to combat environmental and neighbourhood noise, through Part III of the Control of Pollution Act 1974.

Second, through the preparation or approval of codes of practice on minimising noise from particular sources. Such codes do not create offences or have the force of law, but I believe they can help Local Authorities and Magistrates' Courts in exercising their powers under the Control of Pollution Act. The British Standards Institution Code of Practice for Noise Control on Construction and Demolition Sites (BS 5228) has also been approved by the Secretary of State.

For many years, vehicles manufactured for use on the road have had to comply with regulations which lay down the maximum noise they are permitted to make. Motorcycles are no exception, and stricter noise limits have been applied to all those first used on or after 1 April 1983. The Commission of the European Committees has recently proposed limits to take effect in 1991. The Government does not think the Commission's proposals are nearly strict enough, especially in the way they apply to the smallest motorcycles, which form over half the market in the country. We are therefore pressing for more stringent limits. We hope that it will be possible to make progress on this at the forthcoming Environment Council. But we are not ignoring other problems, such as replacement exhaust systems. Enforcement is important too; over 2,800 motorcyclists were successfully prosecuted for noise offences in 1983, mostly for having defective silencers.

Finally, I know that the Society's Noise Committee has undertaken a number of studies, in particular on noise in converted flats, which is a subject of another of the papers to be presented on Thursday. I cannot of course promise that the Government will always share the Society's view, or follow its recommendations, but I can assure you that the work of the Noise Committee will be studied carefully and with interest. We wish it well.

DOE Grant

It is an indication of the value we place on the work of the Society, that this year the Department has been able to help you in a practical way with a 3 year contribution from our Special Grants Programme. The Society is, I understand, planning a number of initiatives, including teaching packs on noise and air pollution, for use in schools. We welcome this and hope that these projects will be successful and widely used. Making a new generation conscious of the effects of noise and pollution could have a directly beneficial effect in years to come. We recognise, too, the important role of the Society's other publications such as the Reference Book and the Members Handbook.

European Year of the Environment

I have touched on a number of environmental issues that concern your Society. I believe that it is important to see environmental issues in the round. Next year there will be an important opportunity for us to get that message across.

Many of you will be aware that next March marks the start of European Year of the Environment. The main aim of the Year is to raise awareness of the environment in all walks of life so that better progress can be made in its conservation and improvement. We have appointed a national committee under the chairmanship of Sir Peter Harrop to organise Britain's contribution. The Committee will be focussing on the conservation of the Natural Environment, the Control of Pollution and Waste, and the improvement of the Urban Environment, including the treatment of eyesores and dereliction.

I hope that the Society will be able to play a part in EYE. We have asked Don Barnett, former Chairman of your South West Division and a speaker tomorrow morning, to sit on the Committee. I hope also that members of the Society, acting either as individuals or as representatives, will be able to stimulate interest in the Year throughout the country.

I also hope that many of you will be able to attend the International Pollution Abatement Fair which will be running alongside the Public Works and Municipal Services Exhibition next April at the NEC. That exhibition in many ways points to the key to our overall approach to the environment. Economic growth and environmental protection should be seen as mutually reinforcing goals.

It is only through economic success that we are able to afford the environmental standards we all desire. And, as I hope the Pollution Abatement Fair will show, protecting the environment itself, if done well, provides economic opportunities. That in itself is an important message. The experience of all those involved in pollution control — and so particularly this Society with its long and honourable tradition of galvanising public awareness of the dangers of air pollution — will have a key role to play.

I wish your Conference every success, and am grateful for the opportunity of speaking to you.

Dr. Martin W. Holdgate, CB, *is a biologist, who did research in the Antarctic and Subantarctic before moving to the Nature Conservancy and then to the Department of the Environment as first Director of the Central Unit on Environmental Pollution. He has been Chief Scientist at DOE since 1976, and is also the Deputy Secretary responsible for the management of the parts of the Department concerned with environment protection (pollution control, waste disposal and conservation).*

SOUTH WEST SEMINAR ON AGRICULTURE

The NSCA South West Division will be holding a One Day Seminar on People & Agriculture — Problems and Solutions at Bristol Polytechnic (adjacent to the M4) on Wednesday 15 April 1987. The programme will establish the problems as viewed by all interested parties and identify existing and potential solutions, with speakers representing a variety of organisations and viewpoints. Fee: £30.00 (NSCA Members and students), £35.00 (others). Full details from: Howard Nowell, Department of Environmental Services, Abbey Chambers, Bath BA1 1NT, Telephone: 0225 61111, ext. 459.

PICTURES FROM THE 53rd CLEAN AIR CONFERENCE

THE PRESIDENT, LEN POOLE, PRESENTING CERTIFICATE OF HONORARY MEMBERSHIP TO VICE PRESIDENT, STANLEY COHEN

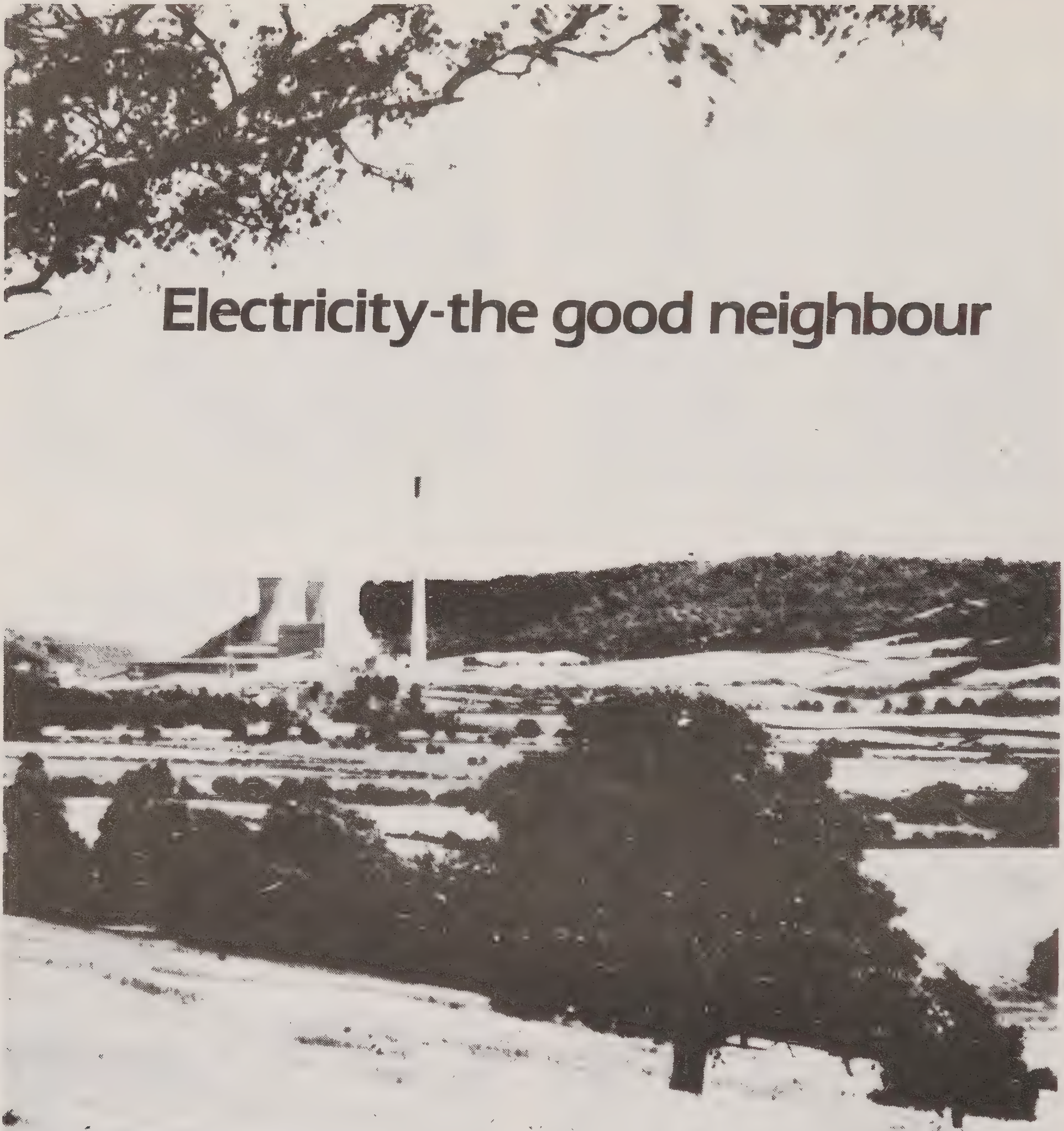
BILL WHEATLEY INDUCTING HIS SUCCESSOR AS CHAIRMAN, IVOR BARKER

DR MARTIN HOLDGATE DELIVERING THE KEYNOTE ADDRESS

VISITORS AT ONE OF THE EXHIBITION STANDS, OPENING NIGHT.

SPEAKERS ON NOISE —
L TO R: ALAN GIBBON, GEOFF KAUFMAN, HYLTON DAWSON (CH.), DAVID ROMAINE, BRIAN WHITTAKER

THE CONFERENCE IN SESSION, EMPRESS BALLROOM, BLACKPOOL



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A POSITIVE CONTRIBUTION

IVOR BARKER, Chairman of NSCA Council 1986-87, talks to **JANE DUNMORE** about his new role and his hopes for the year ahead.

INTRODUCTION

Mr. I.W. Barker

Ivor Barker succeeded Bill Wheatley as Chairman of the NSCA's Council — its governing body — upon his election to the office at the Society's 1986 AGM in Blackpool, October 1986. Ivor Barker started his career in environmental health in Manchester; subsequently he became Chief Environmental Health Officer with Bracknell DC and Director of Environmental Health with the City of Sheffield. He is now engaged as a Consultant, working with Leicester Polytechnic on a project to develop distance learning packages on Pollution Control under the auspices of the Open Tech. He has written and presented a number of papers on air pollution and noise, most recently speaking at the 7th World Clean Air Congress in Sydney. *Clean Air* editor, Jane Dunmore, interviewed Mr. Barker early in November, on his expectations for the year ahead.

JD Congratulations on becoming the Chairman of the National Society for Clean Air. It is a very long stint — your year as Chairman was preceded by two years "running in" as deputy Chairman, and will be followed by another as immediate Past Chairman. What is it that motivates you to take on such an outsize commitment to the Society?

IWB Simply, it is a desire to be involved, a desire to be able to have an influence on affairs. I have never been content to be merely an attender — to raise my hand but not my voice! My main motivation is the desire to make a positive contribution, and I think my experience enables me to do that.

JD But why the National Society for Clean Air? Or is your involvement in other bodies equally as intensive?

IWB I don't think the involvement has ever been so intense as it is with the National Society for Clean Air. But I see it more as an extension of my career, complementary to my work over the years. I have always been involved in the issue of public health, as it was originally, and in environmental care and in particular with pollution control in its wider sense. As my career progressed I became more and more involved with air pollution control specifically, and then latterly with noise pollution control, and so involvement in the National Society for Clean Air just follows on naturally from my career interests.

JD You don't find that the interest within the Society is too narrowly based?

Do you find that your experience in pollution control in the widest sense is reflected and satisfied by your involvement in the NSCA?

IWB This is a topical issue at the moment in the Yorkshire and Humberside Division, where that very question is being asked:

"Is our involvement too narrowly based, should we not be broadening our scope to include all aspects of pollution?". My response to that is that the Society should do what it does best, be most active in those areas where its expertise and where its experience lie, and (I am a great traditionalist) where its tradition lies. And the Society's tradition has been in clean air and air pollution control. Now, we recognise that it is not possible to pursue the promotion of clean air in isolation; we recognise — and we have been discussing in our committees the principle of the "best practicable environmental option" — that any solution to the clean air problem is more than likely to create other pollution problems; flue gas desulphurisation is a classic example. So it is unrealistic to think that we can pursue clean air totally in isolation but our involvement in the further areas of pollution arising out of control of air pollution should not be such that we go off at a tangent.

Tangenital concerns

For example, it has been suggested that we should be involved with the problem of nitrates on land and the leaching of nitrates into watercourses. I think that takes us rather outside our remit, although the deposition of nitrogenous matter as an air pollutant is of course very much within our remit, and so there is a very grey area that we always have to be aware of but which I think should not tempt us to wander outside our initial remit — which is primarily the promotion of clean air.

Noise and nuclear power

JD But having said that, of course the Society has moved very strongly into noise control and I know you give very positive and personal support to the NSCA's Noise Committee. The Society is also putting together a very intensive working party study of civil nuclear matters, looking at the various questions of safety, health and environmental protection. You presumably support these activities and see them as linked somehow to clean air?

IWB Yes, absolutely. I think noise is a special case, if you like. I have often made the point that since noise is propagated through the air, then it could be regarded as an air pollutant. And if we did not take it on board in the National Society of Clean Air, where would it naturally lie? Because as a pollutant it is quite unique and does not fall naturally into any cosy little niche. With regard to the nuclear power issue, that I think reinforces the point that I have already made about the grey area. Our prime concern with nuclear power generation is its potential for air pollution, and I don't think we recognised its potential for air pollution until Chernobyl, and we now recognise that radioactivity is as potent and as emotive an air pollutant as any we have had to deal with. So there is no problem there. But of course the other issues surrounding nuclear power generation, particularly those relating to nuclear wastes, fall into that grey area. They are concomitant problems and I think that it is quite legitimate to take them on board while we pursue the prime interest in air pollution.

JD Do you see us weighing up in the balance the negative environmental effects of other forms of energy generation and coming up with a sort of clean air balance sheet — looking at nuclear power in the light, for example, of fossil fuel use and the concern about acid deposition?

CO_2 cataclysm ?

IWB Indeed: this really crystallises the concept of best practicable environmental option, because it would be wrong to examine the problems relating to nuclear power generation in isolation from the problems of the alternatives. And we already recognise, after 150 years of intense usage of fossil fuels, that they are not without substantial air pollution problems, the most pressing at the moment being acid deposition. But there is another on the horizon which could perhaps be even more cataclysmic, and even more cataclysmic than Chernobyl, and that is the problem of increasing concentrations of carbon dioxide in the atmosphere — the Greenhouse Effect — and the impact that might have on the world's climate and ultimately (although you could not think that this would come into discussion of air pollution) the ability of the world to sustain itself.

JD Changing tack completely, it has become traditional for Chairmen of the NSCA's Council to see as much as they can of NSCA members by travelling to Divisional meetings around the country. Is this something you hope to do, and what sort of contact do you expect to have with the Society's members?

IWB Well, the most immediate contact will of course be with the members of the Yorkshire and Humberside Division — I am the chairman of that Division. But I should like to extend that sort of contact and shall take every chance that offers to visit other Divisions. I hope that they will invite me to a meeting or meetings and give me that opportunity.

JD And when you go to meetings around the country, what do you think that you, as Chairman, will wish to contribute — is there a particular message that you want to put across at this time?

Sharpening perceptions

IWB There is. I am very conscious of the fact, being a local authority representative myself for many years, that the local authority involvement in the National Society for Clean Air is of the essence of its traditions. Certainly, the past 50 or 60 years have emphasised the importance of local authority involvement and commitment in attaining the objectives of the Clean Air Society as they were perceived at that time. I fear that there is a sense now that we have achieved clean air in the United Kingdom, that the problem of air pollution generally can be relegated to a lower priority, certainly within local authorities. Now, I think that is an attitude that *must* be redressed.

JD You mean that some local authorities have gone off the boil because of the smoke control successes?

IWB Yes, the perception has been largely that air pollution is a matter of gross coal smoke pollution. And since we have eradicated gross coal smoke pollution, and to an extent low level sulphur dioxide pollution, I detect a feeling in the local authorities that I have worked for and in other local authorities that we have "done" clean air, and should move onto other things, and consequently clean air has been relegated to a low priority. I fear that with some authorities membership of the Society may be retained largely for nostalgic, sentimental reasons, and perhaps because the Society is thought to be a good rather than a bad thing. What I want to emphasise is the fact that the achievement of clean air, ie the eradication of gross coal smoke pollution, was a beginning and certainly not an end in itself. Not only do hard-won standards have to be maintained, but the problems relating to air pollution are as pressing and as important, if not more important, today than they have ever been. I think that is the message I would like to put across.

JD Oddly enough, that is a message that the young, and those who join the radical environmental groups, seem to understand very well. Perhaps they are not joining the NSCA as individuals because it is seen more as a body for institutions to join — local authorities, for example — than a place for individual concern to express itself. Would you like to promote a broader individual membership?

New blood

IWB Everyone requires infusions of new blood — the NSCA no less than other bodies. Therefore, I think that anyone who has a commitment to the environment, and to pollution control in particular, and an understanding of the problems relating to air pollutants should be encouraged to join the Society as individual members.

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NOISE ABATEMENT IN LARGE TRANSPORT AIRCRAFT

by

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Paper presented at the 14th International Congress of the
International Association Against Noise, Basle, October 1986

INTRODUCTION

A little over a quarter of a century ago the introduction of the civil jet engine brought immense social and economic benefits to the travelling public. But it also brought the scourge of aircraft noise to those people who lived near large and busy airports.

Community reaction led to a resurgence of the science of acoustics which in Britain had lain somewhat dormant since Lord Rayleigh's elegant and classical works of the 1870s. It had been considered that either Rayleigh had 'done it all' or that he was a 'difficult act to follow'.

The aeronautical industry allocated significant resource to the task of first trying to understand and then to control the noise from jet engines. This it has done with a remarkable degree of success. To continue to reduce community exposure to aircraft noise, the present momentum of work must be maintained, particularly if aircraft fleet sizes grow as predicted.

This paper traces the major developments in the silencing of large transport aircraft, outlines some current problems and suggests how all concerned must work together to reduce noise exposure in the community.

THE JET

In the first century BC, Hero's engine demonstrated that forward thrust resulted when a mass of air or other gas was accelerated rearward from a nozzle. All jet engines work on this principle and the thrust which they produce depends on the mass of air which passes through them multiplied by the velocity imparted to it.

$$\text{Thrust} = \text{Mass} \times \text{Velocity}$$

So a given thrust may be achieved by discharging a moderate airflow at high velocity, the converse, or something between the two.

To a large extent the development of jet engines and the rise and fall of the jet noise problem have depended on the way in which mass flow and exhaust velocity have been traded to produce the desired and ever increasing thrust for civil transport aircraft.

Jet Noise

Early civil jet engines were very small compared to those in service today. To obtain a reasonable thrust from the airflow which was able to pass through these small diameter engines required jet velocities in excess of 660 m/sec. But jet noise increases as the 8th power of jet velocity so they were very noisy. The noise is generated outside the engine by the process of jet mixing with the surrounding atmosphere and in these early engines far exceeded any of the internal engine noise sources. Indeed, with the sole exception of rockets, these jets were the most powerful man made noise sources.

Responding to the environmental pressures acousticians set to work on jet silencing. They knew that once the jet had passed through the exhaust nozzle, it played no further useful role in propulsion of the aeroplane. So if the jet could be made to mix and quickly expand into the atmosphere, it would decelerate within a short distance behind the nozzle. This would reduce the area of high speed, turbulent and noisy flow.

Now for a given area of jet exhaust, the standard circular nozzle presents the minimum possible perimeter to atmosphere. Increases in perimeter would give more mixing surface area to aid jet expansion. So over the years a multiplicity of these increased perimeter nozzles were developed. The shapes ranged from long, thin slits, to multiple small tubes and probably most successful in overall terms was the familiar corrugated nozzle with six or eight mixer lobes.

These nozzles reduced the overall noise emission, and increased the characteristic frequencies of the noise spectrum. This residual higher frequency noise was attenuated more than low frequencies would be when passing through the atmosphere. The result was that such devices reduced noise on the ground by up to 10 dB, but at a cost! Increased nozzle perimeter caused increased weight and aerodynamic drag. Furthermore, although the silencer was only useful during the first few minutes of the aircraft's climb out over populated areas, the penalties were present throughout the whole of every flight.

So although successes were achieved and indeed corrugated nozzles are still in service, true silencing of high speed jets has proved to be the most intractable of problems. It is the engine designer rather than the acoustician who has been able to provide welcome relief from jet noise.

THE BY-PASS ENGINE

In parallel with acoustic research, the constant quest for greater efficiency in engine operating cycles led to development of by-pass engines. In these a proportion of the air which entered the intake passed through a low pressure compressor and was then discharged as a low velocity cold stream which by-passed the combustor, turbine and exhaust stages of the hot engine core. Thus in order to provide a given thrust, by-pass engines moved more air, but at a lower average velocity. They were more efficient than pure jets and owing to the V^8 law of noise generation were inherently quieter. At first, by-pass flows were miniscule compared to the main (hot) jet. But as experience was gained, by-pass flows were increased until they first equalled and then exceeded the flow through the engine core. Increases in by-pass were of course accompanied by decreased jet noise but as continuing development led to the era of the large turbofan, there emerged new and urgent problems for the acoustician.

THE TURBOFAN

New knowledge in design and materials technology made it possible to improve on the by-pass engine. Development work has now led to engines in which up to 80% of the flow is by-pass air and only the remaining 20% passes through the highly efficient hot core. Such types are known under the generic title of Turbofans.

For a given thrust, the turbofan may move up to five times more air than a pure jet, but its lower exhaust velocity (some 400 m/sec) will have reduced the jet noise by some 20 dB. However, the benefit of this massive reduction could not be appreciated by the listener had there not been major success in silencing other noise sources inside the engine itself. It is these that have challenged the acousticians from the 1970s until today!

Silencing the Turbofan

The main noise sources associated with the turbofan, or indeed any other gas turbine, are:

The Jet —	noise generated by the jet mixing with the atmosphere. As the source of this noise is outside the engine it radiates freely.
Machinery and Combustion —	noise from the combustion process and from airflow around both fixed and rotating components. These sources lie inside the engine. The noise therefore is constrained to travel along the internal ducts. It radiates from the inlet and exhaust and to a much lesser extent through the engine casing.

As development of the turbofan proceeded and jet noise decreased, machinery and combustion noise, which had hitherto been masked, began to intrude upon and then at certain operating conditions, to dominate the engine's noise signature. Indeed had they not been silenced, today's large turbofan would overall be little quieter than some early low by-pass engines.

MACHINERY NOISE

Airflow past fixed and rotating components in the fan, compressor and turbine gives rise to the machinery noise which consists of a broad band component which covers the entire audible spectrum, plus superimposed discrete tones. The broad band component sounds rather like the roar from a waterfall and the discrete tones are manifested by the familiar whine often heard when an aircraft is landing. The frequency of the tones at any instant is determined by the number of blades and the rotational speed of the engine.

The acousticians were faced with the problems of how to reduce these noises at source and then to suppress the residual noise before it radiated from the inlet or exhaust.

Reduction at source resulted from techniques such as:

- optimising the number of blades in each row
- optimising the spacing between adjacent rows
- optimising the profile of the blades themselves
- minimising the number of stages in the fan module
- removing obstructions so as to give streamline airflow on to the fan blades.

High natural attenuation of tone noise has been found to occur within engines fitted with the latest wide chord fan blades. This, coupled with a design which makes the noise propagate counter to the direction of fan rotation plus measures to reduce noise at source, has rendered these most advanced fans virtually toneless. As tone noise is more annoying that broad band, the subjective improvement has been considerable!

SUPPRESSION OF RESIDUAL NOISE

Until it passes through the inlet or the exhaust, noise originating inside the engine is constrained to propagate both with and against the airflow within a duct. It is therefore possible to absorb a proportion of that sound by means of various acoustic absorbent (or sometimes reactive) materials judiciously placed in the duct walls. Although the design of such devices is not normally very difficult, the engine case is complicated by the unusual temperature and airflow conditions. However, the application of classical ray theory has proved a useful tool even in the face of such difficulties.

Much engineering effort has been expended on developing sound absorbent or reactive structures which are able to survive the extremely hostile environment within the engine ducts.

COMBUSTION NOISE

Still one of the least understood of the internal noise sources is the combustor where vast quantities of energy are released within a very small volume. Why some fuel burning systems are quieter than others, and how combustion may influence the jet mixing process, are still subjects for detailed study.

WHERE ARE WE NOW?

In Rolls-Royce, a multidisciplinary approach to environmental problems has paid handsome dividends in the shape of a powerful, clean, efficient and quiet powerplant for civil airliners. Incorporating all current aspects of pollution control, the latest turbofan engine has:

- 80% by-pass airflow
- a special nozzle assembly which mixes by-pass and core flows to give a slower, quieter exhaust

- tone control techniques built into the fan
- advanced noise suppression built into the ducts
- been shown to be 20EPNdB quieter than earlier engines
- allowed the aircraft which it powers to be the first large commercial aircraft permitted to operate both into and out from the highly noise-sensitive Washington National Airport at night.

In addition to good silencing the engine:

- is 40% more fuel efficient than the previous generation
- emits ten times less carbon, unburnt fuel and smoke.

The new technology demonstrated in this engine has led to the company winning the Pollution Abatement Technology Award which is sponsored by the Environment Foundation and promoted by the Confederation of British Industry, the Department of the Environment and the Royal Society of Arts.

THE PRACTICAL LIMIT TO TURBOFAN SILENCING

Today's turbofan is some 20EPNdB quieter than engines of the 1960s and the main noise sources — fan, combustor, turbine and jet — are of comparable magnitude. But as this paper will explain, there is still a need for further noise reduction at source if the situation around airports is to continue to improve.

Further noise reduction is possible although it will occur in small steps rather than quantum leaps. As in all silencing, elimination of the loudest source is followed by a law of diminishing returns as hitherto unimportant sources emerge from the noise floor and begin to dominate.

So far as engine internal noise is concerned, the apparently attractive option of merely adding more noise suppression inside the ducts is simply not available. This is because when the by-pass ratio exceeds about 6:1, the length of nacelle needed to contain sufficient noise control becomes prohibitive. Therefore work on suppression at source and on noise control devices must continue in parallel. We must also bear in mind the fact that today's discoveries will not make themselves evident at the airports for some fifteen to twenty years.

In addition to turbofan silencing, due attention must also be given to the aeroplane itself and the manner in which it is flown.

AIRFRAME NOISE

One new source that has assumed great importance as engines have become quieter is the aeroplane itself. When a large civil airliner is descending to land with its engines throttled back to a low thrust, noise from the fuselage is comparable with that from the engines. One has only to hear the wind whistling under a door to realise how much din can be generated by bulky and complicated wing, flap and undercarriage structures travelling through the air at some 250 kilometres per hour! There remains much work to be done in airframe noise suppression.

The detailed geometry of an engine/airframe installation can also be very important. It may either amplify existing noises or give rise to new sources if there is interaction between say the wing and the engine exhaust. Replacing a standard installation by one having idealised geometry could reduce noise on the ground by up to 3 dB.

AIRCRAFT PERFORMANCE

Whatever can be done to improve the aerodynamic performance of the aircraft itself, is likely to provide some acoustic benefit. For instance, an increase in the lifting efficiency of the wing can reduce the demand for engine thrust or can increase the altitude of the aircraft at a given distance from the start of the take-off roll.

QUIET FLYING

Whatever the inherent noise of an engine/airframe combination, there are a number of techniques which the operator can employ in order to minimise noise on the ground.

Take-Off Noise

Noise Abatement Take-Off

Subject always to the overriding consideration of flight safety, take-off and climb-out patterns can be adjusted to minimise noise disturbance. In a noise abatement take-off, the aircraft uses the maximum desirable power to take-off, climb steeply and gain the maximum possible altitude before reaching the community or the noise monitoring point. The engines are then throttled back to maintain only a minimum rate of climb, thus giving less noise on the ground. After several miles optimum thrust is then reapplied to enable the aircraft to climb normally. Although such take-offs are unpopular with pilots, for they impose additional burdens at a time of high workload, they do afford considerable relief to residents in the areas concerned.

Noise Preferred Routes

Detailed flight paths can be planned to ensure that departing aircraft overfly open or lightly populated areas. But diverting a fully loaded aircraft does impose a fuel penalty. Also there is controversy as to whether it is ethical to make a few people suffer for the benefit of the many!

Landing Approach Noise

Managed Drag

The current standard of navigational landing aids dictates that aircraft on the approach path have no flexibility to choose their route or altitude. They are constrained to a 3°

glide slope for several miles out from the runway threshold. This instrument landing system (ILS) can handle comparatively few aircraft at once and routes each of them over the same houses! But a new microwave landing system (MLS), now on trial, is predicted to become the international standard. MLS uses a fan shaped microwave signal beam which can spread up to 70 nautical miles wide and 6000 metres high. Aircraft can lock on to it from 20 miles out and are then free to choose a whole variety of curved and steep approaches to the runway. Not only will this encourage managed-drag approaches, but it will also distribute the approach-noise burden much more widely.

Managed-drag techniques have proved crucial in the case of aircraft such as Concorde. At present certain airports encourage managed drag but others regard it with disfavour on the grounds that it is 'too complex'.

New Navigational Aids

Serendipity seems to be working for those who seek relief from the noise of landing aircraft. Currently these aircraft fly down the pencil-like radio beam which traces the 3° glide slope for several miles out from the runway threshold. This instrument landing system (ILS) can handle comparatively few aircraft at once and routes each of them over the same houses! But a new microwave landing system (MLS), now on trial, is predicted to become the international standard. MLS uses a fan shaped microwave signal beam which can spread up to 70 nautical miles wide and 6000 metres high. Aircraft can lock on to it from 20 miles out and are then free to choose a whole variety of curved and steep approaches to the runway. Not only will this encourage managed-drag approaches, but it will also distribute the approach-noise burden much more widely.

THE NEXT GENERATION: PROPFANS?

It seems remarkable that the wheel of development in aero engines has turned almost full circle. Starting with propellers which moved large masses of air at low velocity, we progressed to the jet which did the converse. Thence through the by-pass era to the turbofans again moving large masses at low velocity. But the turbofan replaced the original four-bladed open propeller with a many-bladed rotor contained in a duct.

Now the next generation could demonstrate a more surprising reversion to what may seem old technology in the form of an open propeller! Research studies have already started into the concept of a highly efficient core engine (gas turbine) driving a high speed open rotor (propfan). This would probably have two contra rotating pusher type propellers mounted at the rear of the engine. It would move even larger masses of air at even lower velocity and current predictions are that it has a potential fuel saving of 35% over modern turbofans. But as ever there are snags:

- as the open rotor is by definition not contained in a duct there must be assurances about blade integrity and blade containment in the event of possible failure;
- the comparatively forgotten problems of cabin noise and vibration will recur and must be solved. Residual noise and vibration will demand cabin insulation that can

cope with relatively low frequencies, which is always difficult;

- as there is no duct in which to install noise suppressors, the inherent noise of the open rotor plus the effects of interaction between its stages could be formidable.

So it may well be the acoustics which dictate whether this type of propulsion is feasible for airline service. In any event, there will be a long gestation period and the propfan is unlikely to be seen at airports before the mid 1990s. Therefore the growth sector over the next decade is likely to be in aircraft powered by developments of the existing and well tried turbofan.

WHY THE RESEARCH EFFORT MUST BE MAINTAINED

Over the past 25 years silencing as outlined in this paper has reduced noise exposure at 'operationally saturated' airports by some 50%. Regrettably this has led some to an opinion that the research effort may now be relaxed. But this opinion is simply a dangerous reversion to the turn of the century view that 'we have done it all'!

In spite of the fact that recently some 1800 of the noisiest aircraft were grounded by international agreement, old technology aircraft still prevail. As the life of large civil transports may be thirty to forty years, airlines will be reluctant to replace them unless economic considerations dictate that they must. So the world fleet currently comprises a mixed bag of some 7000 aircraft with new ones being added and old ones withdrawn continuously. But there is no reason to suppose that the underlying trend of steady growth will not continue until by the end of this century the fleet will stand at about 10,000 aircraft.

It is therefore reasonable to forecast that from now until about 1990 we shall see a small but steady decline in airport noise as more old aircraft are replaced by new technology. But after that the growth in fleet size and consequent increase in the number of movements will begin to dominate.

If society desires a reduction in airport noise beyond 1990, there must be further silencing of the engine and aircraft noise sources. No other option is available. As it takes some fifteen to twenty years for significant advances in noise technology to be felt around the airports, we must continue to incorporate all the proven ideas which are in the pipeline and concurrently sustain a vigorous programme of research into all feasible aspects of engine/airframe silencing, installation effects, aircraft performance and quiet flying techniques.

EFFECTIVE NOISE ABATEMENT IN LARGE TRANSPORT AIRCRAFT

While the travelling public continues to enjoy the benefits of ever swifter and more efficient air travel the quality of life for those resident near airports must be improved. Effective noise abatement in large transport aircraft must therefore be sought through the combined efforts of various sections of society.

Politicians and legislators must frame regulations which reflect the aspirations of society, emphasise the best practicable means of noise abatement and direct the effort to where it will do most good.

Acousticians and engineers in the aeronautical industry must be given adequate support and facilities to carry out the necessary research and development of quieter engines and airframes.

Airport authorities must be encouraged to adopt vigorous good neighbour policies. They should give financial incentives to those airline operators who assist the good neighbour policy by investing in quiet aircraft and/or employing quiet-flying techniques.

In any noise sensitive development near an airport, planners, architects and builders must co-operate in employing the most effective techniques of urban layout and noise insulation.

Finally, an organisation such as the International Association against Noise and its constituent national bodies have vital roles to play in educating and encouraging those concerned to each play their part. Conscious of your support, we in the industry look forward to the next quarter century in confident anticipation of what can be achieved in effective abatement of the noise from large transport aircraft.

Note:

Any opinions expressed are those of the Author and not necessarily those of his employer.

ACKNOWLEDGEMENT AND REFERENCES

The Author gratefully acknowledges the support given by colleagues — Mike Smith, Chief of Noise Technology, Rolls-Royce plc and George Vulkan, London Scientific Services. Greater detail on some of the topics covered in this paper may be found in their publications:

M J T Smith: Aircraft Noise Control — Prospects for the 21st Century: National Society for Clean Air, 136 North Street, Brighton BN1 1RG, England.

G Vulkan: Airports and the Community: London Scientific Services, Greater London Council, Room 708B, The County Hall, London SE1 7PB, England.

TECHNICAL GUIDANCE ON SOUND INSULATION

The NSCA's 2nd Report on Sound Insulation In Flat Conversions will be published in January 1987. Covering remedial and planning aspects of conversions and suggesting a range of recommended treatments for party walls and floors,the Report is intended for use by local authorities and anyone undertaking flat conversions. Price £2.95 incl., from the NSCA.

UPDATE

AIR-LEAD LEVELS DOWN BY 50%

Air lead levels are down by 50%, following reductions in the lead content of petrol.

The new air lead levels follow a 60 per cent reduction of lead in petrol in December 1985 from 0.4 to 0.15 grammes per litre — the lowest level that is needed by most cars on the road today.

Welcoming the news, Environment Minister William Waldegrave said: "This dramatic reduction of lead in air that we breathe is a direct result of the Government's decision to reduce petrol lead levels from December last year. But this is not the end of the road. We are taking steps to encourage growth in the availability of unleaded petrol and already over 160 petrol stations are offering it. We now look to the car manufacturers for an increasing choice of new cars able to run on it."

A preliminary analysis of results obtained by a number of UK laboratories shows that air lead levels in the first quarter of 1986 have dropped to an average of 0.29 microgrammes per cubic metre (ug/m^3) compared with an average 0.56 ug/m^3 during the same period in 1985.

The full results of the research, which draws on data taken at 21 monitoring stations at a range of kerbside, urban and rural locations around the UK, will be published by Warren Spring Laboratory.

Anglers' lead weight ban

Most lead shot for angling is to be banned as from 1 January 1987.

Voluntary efforts by anglers to switch from lead weights responsible for swan deaths to non-toxic alternatives by the end of the 1985/86 fishing season have not been enough.

The new laws will make it an offence to import or supply all lead weights for angling of less than 28.35 grams (equivalent to 1 oz), except the smallest shot. 'Dust shot' up to and including 0.06 grams (equivalent to No. 8 shot) will not be affected.

Some items of fishing equipment which contain lead but which by common consent do not cause swan deaths, will also be exempted. These are swim-feeders, self-cocking floats, lead core lines and weighted fishing flies.

ROYAL COMMISSION ON ENVIRONMENTAL POLLUTION APPOINTS NEW SECRETARY

Mr G I Fuller has been appointed Secretary to RCEP, in succession to Mr T E Radice. Mr Fuller was seconded to the Commission from the Department of the Environment where he headed one of the divisions in DOE's Planning and Land Use Policy Directorate, with responsibilities which included the management of the Housing and Planning Bill at present before Parliament, implementation of the European Community Directive on Environmental Assessment, and policy on planning control over hazardous substances, public inquiries, and awards of costs.

After reading law at St Catherine's College, Cambridge, he began his career in local government and was admitted as a Solicitor in 1962. In 1967 he joined the then Ministry of Housing and Local Government as an administrator. He has been head of the Minerals Planning and Nature Conservation Divisions, and in one of his earlier posts he was the Secretary of the Clean Air Council.

Tom Radice, who was Secretary to the Royal Commission for nearly 5 years, is returning to the Department of the Environment, where he will take up duty as Head of Heritage Sponsorship Division at 2 Marsham Street. The NSCA wishes him, and his successor every success.

NEW CHAIRMAN FOR THE CENTRE FOR ENVIRONMENTAL TECHNOLOGY AT IMPERIAL COLLEGE

Dr Iain Thornton has succeeded Professor Gordon Conway as Chairman of the Imperial College Centre for Environmental Technology. The Centre was formed 9 years ago under the leadership of Professor John Sutton FRS, and Professor Conway, and has a strong international reputation for advanced course training and research, with an emphasis on environmental policy, planning and law.

Dr Thornton is an environmental geochemist specialising in the study of heavy metals and trace elements and their pathways from rocks, soils, and man-made pollution to farm animals and people. His first assignment after taking up his new post will be to visit the Lake Nakuru National Park in Kenya to work with the Rhino Rescue project of the Government Wildlife Conservation and Management Department.

SPECIALIST INSPECTOR REPORTS

A new series of technical publications, under the broad heading Specialist Inspector Reports (SIRs), has been launched by the Health and Safety Executive (HSE). The reports contain information from, and views of, Specialist Inspectors developed from their experience in visiting workplaces. It is hoped that they will stimulate comment and debate amongst all those interested in technical matters affecting health and safety.

Ten titles are planned during the first year. Three have now been published:

- Vacuum transfer systems for asbestos waste material.
- Dust control at lead crystal glass cutting.
- Control of exhaust fumes from vehicles working in enclosed spaces.

They are available, free of charge, from:
Health and Safety Executive, Technology and Air Pollution Division, Room 315, St Anne's House, University Road, Bootle, Merseyside. Tel: 051-951 4564.

RUBBER DUST: OCCUPATIONAL EXPOSURE LIMIT

A Control Limit for occupational exposure to rubber process dust has been adopted by the Health & Safety Commission.

The limit will apply to the mixtures of dusts arising at various stages in the manufacture of articles or intermediates from natural or synthetic rubber. It will necessitate control so that workers' exposure to total inhalable mixed dust does not exceed 8 milligrammes per cubic metre of air (as a time-weighted average over 8 hours).

4TH ENVIRONMENT ACTION PROGRAMME

The Commission of the European Communities has now published its proposals for the Fourth Environmental Action Programme 1987-1992 (1). The Programme marks a definitive move away from reacting to environmental problems after they have arisen, towards a general preventive approach aided by scientific and technological equipment and proper management to achieve high environmental standards.

Such standards are also the central purpose of the European Year of the Environment — EYE — which starts on 21 March 1987, the first day of Spring. It offers the opportunity to launch the major transformation in attitudes and approach that the change of philosophy that is required in the field of environment protection will demand.

The EYE, however, is not an end in itself; nor is it a Year that will cease to have impact once it is over. It must, according to the Commission, be seen as a launching pad for a new approach. The aim of the Fourth Programme is to spell out the measures that will be necessary at Community level during the first part of this new phase in the development of the Community's environmental protection policy. The Commission also intends to encourage the public at large to understand the dangers and, where necessary, put pressure on governments for action.

Furthermore, the Commission will be urging the Community's industrial and business world to keep environmental considerations in mind when they plan new plant. "Environment must be seen as a major element of both national and international politics. The key phrase — *prevention of pollution* — should be the watchword for the next five years", says Commissioner Clinton Davis.

The 1987-1992 Programme names eight priority themes which will be tackled over the period:
- further action to reduce air pollution
- intesified efforts to deal with water pollution
- strict controls on chemicals
- new measures to govern biotechnology development
- the safe use of nuclear power
- a new emphasis on conservation of natural resources
- protection of the soil
- disposal and recycling of waste.

The Commission's proposals follow from the declaration by the European Council in March 1985 that the protection of the environment could contribute towards the Community's economic growth and the creation of jobs. The Single European Act — which when ratified will amend the 1957 Rome Treaty for the first time — deals with the environment under three heads:

- safeguarding, protecting and improving the quality of the environment;
- contributing to the protection of human health;
- assuring rational and prudent husbanding of natural resources.

The Commission's new-look environment policy supports a number of political principles. These include: preventive action against pollution at its sources; the polluter to pay; concern for the environmental impact on industry and related fields; the need for equal treatment among the Community regions.

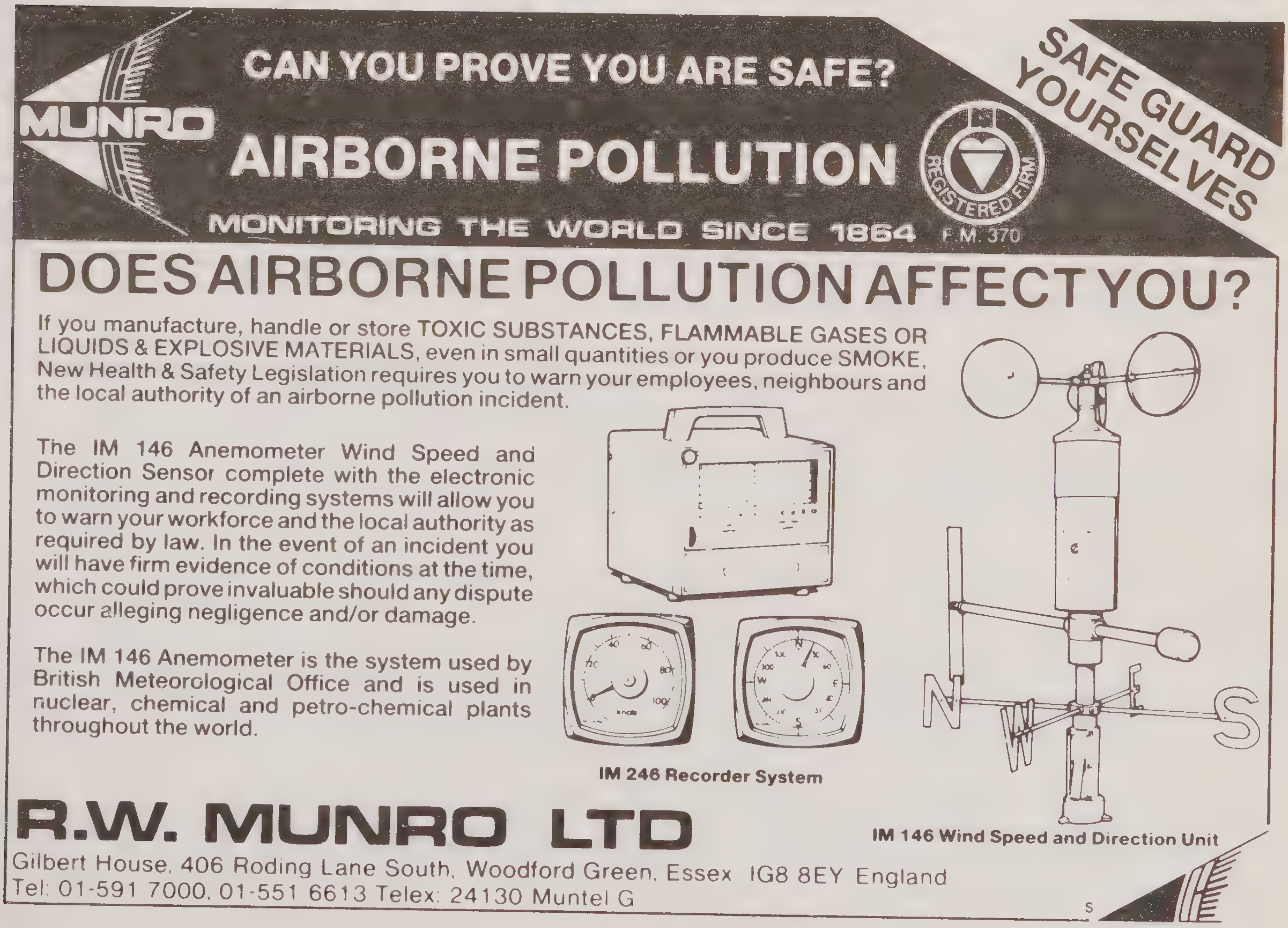
Policy proposals

The Commission considers that the implementation of Community legislation will be of primary importance. That means that member countries must apply Directives fully bringing national law into line. The Commission suggests appointing Community environment inspectors (not, at present, favoured by France and the United Kingdom) and would initiate infringement procedures if necessary. The Commission would also encourage individuals and non-governmental organizations (NGOs) to report poor implementation of EC law, and to organize seminars and workshops for exchanging experience between national authorities. From 1987 the Commission intends to produce draft Directives linked to the priority themes.

On *air pollution;* the Commission states that this has undoubtedly been a major cause of the deterioration of Europe's forests, it threatens to destroy irreplaceable architectural heritage, and is a menace to human health.

The Commission points out that the Community has already legislated stricter standards for petrol-engined cars, and proposals are now being considered for diesel-engined cars and lorries. There is expected to be an agreed reduction in the sulphur content of some liquid fuels and on the amount of lead in petrol. Cutting down power station emissions is not easy for some of the 12 Community countries (including the UK), although the Community is committed to making progress in this field.

(1) COM(86) 485 of 9 October 1986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14TH CONGRESS OF THE INTERNATIONAL ASSOCIATION AGAINST NOISE (*AICB)

(7TH – 10TH OCTOBER 1986)

Report by Hylton Dawson, Chairman of the NSCA's Noise Committee

In October I had the honour of representing the National Society for Clean Air at the 14th Congress of the International Association Against Noise (AICB) which was held in the European World Trade and Convention Centre of the Swiss Industries Fair, Basel.

The subject of this Congress was 'Traffic Noise and Urban Planning' and the main subjects under discussion were:

- latest results in the abatement of noise from aircraft, railways and road traffic;
- town and country planning with particular reference to noise control;
- practical measures to control noise from traffic;
- consideration of the cost effectiveness of planning/silencing measures;
- legislative and administrative means of control.

To the disappointment of the organisers, attendance was down to approximately 150 delegates, but every session was well attended and the debates were lively and well structured.

THE CONGRESS PROCEEDINGS

The noise from tourism was highlighted as being a significant and increasing problem and speakers from some of the European Spa Towns outlined what they were doing in terms of both engineering and planning control. Some French delegates supported the long established view of the NSCA that in dealing with traffic noise, there was a need for more emphasis on the control of the low frequencies.

A speaker from Baden-Baden described the widespread urban problem of noise nuisance in flats inadequately insulated both from the outside world and from each other, and emphasised that the problems were not caused by anti-social behaviour but by the normal daily activities of people living in close proximity.

On the control of noise in residential urban streets, several speakers showed that the combined effects of legislation, planning and landscaping could dramatically improve the quality of life for those concerned. It is now becoming quite common for recreation areas and tree planting to be carried out on roads, which hitherto had carried through traffic, and still provide adequate passage for service and residents vehicles.

Some German studies on the physiological effects of noise at moderate and low levels conclude that the direct harmful effects were difficult to establish. However, the stress induced by exposure to such noise was very real and medical opinion strongly supported any attempt to contain the noise problem.

The paper, entitled "Noise Abatement in Large Transport Aircraft" which I gave on behalf of the Society, was well received and the subsequent discussion showed that there is still great scope for planners, politicians, airport authorities and aircraft operators to co-operate in improving the environment local to airfields. Further developments in airframe/engine silencing and in navigational aids/techniques will also have a powerfully beneficial effect! *(Editor's note: this paper is published elsewhere in this issue.)*

All in all, the technical interchanges demonstrated the need for concerted international action and several delegates expressed their interest and appreciation of the work being done by the NSCA.

AICB BOARD MEETING AND GENERAL ASSEMBLY

The Board

At a meeting of the Board, which is the seven-strong governing body of the AICB, the following decisions were taken.

- The NSCA was fully installed as the UK representative body. The individual Board members are now:

President	Dr Judith Lang (Austria)
Vice-President	Professor Schar (Switzerland)
	Dr W Carlein (FR Germany)
	H Dawson (United Kingdom)
	Mr Kracht (East Germany)
	Mr Yost (France)
	Mr Zarkoff (Bulgaria)
Secretary	Dr W Aecherli (Switzerland)

- The next Congress will be held, probably September 1988, at Lake Balaton, near Budapest in Hungary and the theme will be "Noise Abatement – State of the Art and Applications".
- The annual subscription will increase from 200 Sw Fr to 300 Sw Fr.

Every opportunity will be taken to improve both exchange of data and concerted action plans between the countries, and to this end the Board asked to be kept fully informed of activities undertaken by the NSCA.

General Assembly

At a subsequent meeting of the General Assembly at which at the AICB members convened, the decisions of the Board were ratified and I had the opportunity to present the brief prepared by Jane Dunmore on the work of the NSCA. This report was very well received and the President stated that she was expressing the views of all present in wishing the NSCA well and requesting that it did everything it reasonably could to help the AICB foster international contact and coordinated activity in the control of noise.

PUBLICITY

As a result of advance publicity put out by Jane Dunmore, the BBC requested me to interrupt my homeward journey in order to give them a report. By invitation I visited Bush House and recorded a piece for transmission in their World Service Broadcasts.

Note *To avoid any anguish on the part of the literati or crossword fans, AICB stands for 'Association Internationale Contre le Bruit'

International Conference on the Biological Effects of Ionising Radiation

Sponsored by Friends of the Earth UK and Greenpeace International and held at the Hammersmith Hospital, 24-25 November 1986

Some Impressions — by R.S. Scorer

The public discussion about civil nuclear power is already damaged by campaigners whose mind is made up in advance and an industry whose attitude is condescending towards the public. A speaker at the BEIR Conference who tried to emphasise this polarisation by describing the extremes as the *only* viewpoints did not get much sympathy. The chairman had already tried to soften the supposed antagonism by using the metaphor of a pancake — having two sides which were nevertheless close together because the pancake was very thin. However, most people do not want to be pushed into a labelled category when they have not made up their minds in one of just two ways. Overall, the conference mood was for serious study, and most speakers responded with tolerance and good humour, the organisers having provided a very fair spread of expertise and standpoint.

The early industrial revolution approach of "carry on until it is proved harmful" is clearly unacceptable in the case of nuclear power because of the potentially disastrous form of the risks; yet, "don't do it until it is proved safe" is not an acceptable alternative. The traditional approach is "don't avoid it simply because it is risky", which is not inconsistent with the a.l.a.r.a. (as low as reasonably attainable) formula for permitted pollution levels, and the "best practicable environmental option" principle. The implication is that levels should not be allowed to increase above what has already been achieved. There was therefore some consternation that the International Commission on Radiological Protection (IRCP) has recently raised the level of the recommended maximum radiation doses to certain organs and to the whole body. One speaker tried to defend this relaxation of control by listing all the medical folk who had died from excessive radiation (mainly X-rays) and saying that it was they who had set up ICRP; but that non sequitur did not go down well.

The traditional method of trying to find out whether a source of pollution is responsible for health damage is to examine the epidemiological statistics and search for correlations. That worked well when dealing with tens of thousands of deaths from lung cancer and other diseases possibly due to cigarette smoking, and it gave a reliable result before the precise mechanism had been investigated. But it simply does not work when applied to 4 deaths from leukemia among children close to Sellafield over a few decades – when the number expected in the absence of any overt cause was a mere 0.5. These deaths were also described as being "due to chance", which is a phrase describing human ignorance rather than the absence of a real cause.

The argument went as follows: given the risk factors it would have been necessary to dose the whole public with an impossibly large dose in order to produce the 4 leukemia deaths. The risk factors are very uncertain because they describe the relationship between dose and deaths at the very extreme end of the range where the data are very few.

Nevertheless, deaths from leukemia are caused. And, when challenged to say how a child at Seascale could take in sufficient radioactivity from the Sellafield emissions to cause it to contract leukemia, the speaker said he and his colleagues had tried very hard to imagine how it could be done and had come to the conclusion that it was practically impossible, however much soil and seaweed and other likely polluted material the child consumed. Why that sensible consideration of the problem had not been described instead of the very roundabout method of considering the whole population and an imaginary risk factor, we were not told.

There are many other places where the incidence of child leukemia was locally much higher than the average and it was suggested that this could be the result of local epidemics of indigenous infections. There was a detectable effect of the nuclear bomb tests of the years around 1960, and about one fifth of child leukemias could be attributed to ante-natal exposure to X-rays. Indeed, it was likely that most had been caused in the early days after conception.

It is important to understand that child leukemias have increased in recent decades because children with latent leukemia have been saved by antibiotics from death by pneumonia and other infections. The clusters might even be in places where the other infections had been more effectively eliminated. If leukemia is usually initiated before birth then many cases are probably eliminated naturally by miscarriages, and if these have been reduced by improved ante-natal care it could be a cause of child leukemia. Interference with natural mechanisms without appreciating the consequences may have quite bizarre effects.

The chairman's opening slide, which was repeated later by another speaker, showed that the Chernobyl accident had contributed a mere 2 per cent to the annual radiation dose of the British public, and most of that was natural anyway. But that is like averaging a local flood over the whole country and calling it a mere half a millimetre of rain, for it is no comfort to people in the relatively small areas where rain deposited most of the radioactivity. It is absurd that information should be presented in such a way as to convey no useful meaning. But it is no more absurd than the widely used calculations which attempt to determine the number of cases of leukemia, when they are very few, from information about cases in very large populations which suffered a relatively large individual dose. The only credible method is to investigate whether an individual child can collect a dose large enough to cause the disease. At present we do not even know for certain when the dose in actual cases was acquired, and so there is a lot of work to be done on the data available on cases induced by X-rays and the bomb tests around 1960.

In the area around Munich, where about 5 million people and 5 million cows live, a wide range of fission products was deposited, but very unevenly. The long term and short term exposures of the population rose and fell after the Chernobyl accident, and the presence of radioactivity in fruit and vegetables will decline slowly over several years. The immediate risk was from iodine in milk, but the long term effect is due to caesium. Overall, however, the long term outcome is expected to be one cancer case in 10,000 people, which cannot be detected because it is below the normal variation from year to year.

A study of the effects of various products of incomplete combustion of organic materials on the chromosomes of blood cells revealed their frightening carcinogenic potential. The well known example of cigarette smoke illustrates the magnitude of the effect. They are probably a much greater cause of cancers than viruses and radiation together, and we must not forget that smoky vehicle exhaust is in this category. Previous work which exonerated diesel exhaust needs to be checked.

A very constructive paper was delivered by David Gee of the General and Municipal Workers Union. He was concerned with the welfare of workers in nuclear establishments. He insisted that the definition of safe levels of radiation dose should not be higher than any authoritative estimate: higher estimates than the lowest might be misleading because of unknown circumstances, and he again challenged the justification for ICRP's recently raised recommended limits. This was supplemented by a formula for compensation for ill health which could be partly attributed to radiation received at work. It was a very sensible way of avoiding litigation over compensation which usually ends in an 'all or nothing' award, even though the responsibility is recognised as nearly always partial. BNFL has evidently agreed to this commendable advance.

The human spirit of adventure is certain to prevent any effective ban on further development of civil nuclear power. But adventurers are not entitled to take unwilling people along with them under false pretences or without explaining the nature of the risk. We have some distance to go before that explanation can be regarded as adequate, and the adventurers had better learn quickly to avoid being economical with the truth. They have been found wanting in the recent past and it has been their own ignorance they have been concealing. One must grant that they were not fully aware of this because they have not sought severe criticism by exposing the full nature of their position. They have also regarded criticism as inspired by committed campaigners for whom they have not concealed their contempt.

The proceedings of the BEIR Conference, edited by Professor Sir Richard Southwood and Dr. Robin Russell Jones, will be published by John Wiley & Sons Ltd, Chichester.

INDUSTRIAL AIR POLLUTION – 1985 REPORT

The 1985 Report of HM Industrial Air Pollution Inspectorate and the Report of the Industrial Pollution Inspectorate for Scotland, was published in October 1986. At the report's launch, Chief Inspector Rodney Perriman said that a significant change in the Inspectorate's work was inevitable in the years ahead. Under forthcoming new clean air legislation, a considerable proportion of processes – for example, those producing dusts – would probably be devolved to local authorities, leaving the relatively small central Inspectorate to devote itself to the problems of chemical pollution. Local authorities, he said, should be provided with more effective means of controlling emissions, and a Working Party under Mr. Perriman's chairmanship has recommended that local authorities should have new powers of prior consent within an open system of plant authorisation. The IAPI (or that Section of the HM Inspectorate of Pollution) would move from their annual system of registration to a new system of authorisations lasting 3 or 5 years, which would provide a more meaningful system of consents.

For the immediate future, the Inspectorate will continue to operate under the Health and Safety at Work Act 1974, under some sort of agency agreement. Some parts of the new combined Pollution Inspectorate will function as an enforcement agency, while others will have primarily an advisory role. But in the longer term, new primary legislation will be required to bring under one practical umbrella the various operations of the new Inspectorate.

Rodney Perriman also looked ahead to the Inspectorate's response to public pressure for more openness in the administration and enforcement of pollution control legislation. He thought it likely that emission tests taken to check compliance with emission limits in consents would be published, together with reports at about annual intervals, plus the opening of registers for public scrutiny.

Turning to the year under review (1985), Mr. Perriman reported that complaints about electricity works' operation were down on the previous year, probably due to the return to normal conditions following the end of the miners' strike. While standards for new plants had steadily improved, there were still a number of old processes with very obvious visible or smelly emissions. These included: works melting under flux, with their visible salty fume; older cement works, with low level dust from clinker storage and the like; gas and coke works; iron and steel; and mineral works. Petroleum works were also subject to complaints, mainly about odours.

The Inspectorate's work had been inhibited during the year by lack of manpower. The full complement is 36 people in the field and eight at Headquarters, but the Inspectorate had been short of four Inspectors and that deficit would be rising to 6. The problem was that the present salary scale made the Inspectorate uncompetitive with industry and thus they could not recruit people of the right calibre. The great danger of accepting lower calibre recruits was that the Inspectorate might lose the confidence of industry. In terms of operations, the shortfall in manpower had meant that the Inspectorate had consciously to restrict its activities. The Chief Inspector had issued guidance to say that normal rules such as, "every works should be visited at least once a year" no longer applied. In addition, more complaints and requests for help were dealt with by letter or over the phone, rather than the preferred response of personal visits.

Highlighting improvements during 1985, Mr. Perriman pointed to the new chemical fertilizer processing plant at Chester, with its invisible fume, the modification at two primary aluminium plants which had resulted in reduced emission of fluoride, the £40 million dust arrestment plant update at electricity generating plant and the low NOx burner trials, and the commissioning of the new Ancit process at the Phurnacite plant in South Wales.

The Inspectorate had conducted research on the development of monitoring techniques and non-chimney emission control during the year and had devoted a lot of time to consideration of standards for new or modified plant. They were in the process of producing a whole series of new BPM Notes, perhaps the most significant of which would be the new "BPM Note for large boilers and furnaces" which would replace the old "electricity works" BPM Note. This would entail new emission limits for acid gases, to be applied to new plants and, when possible, as rolling improvements on a plant by plant basis at existing works. The new emission limits would apply to large plant, down to about 50 MWt. For the largest plant this might involve a limitation on the sulphur content of coal burnt to 1.6%, and then 90%+ removal of sulphur oxides; flue gas desulphurisation would probably be necessary on plant of 700 MWt upwards, and fluidised bed with limestone injection might be required for smaller plant.

Reference: Industrial Air Pollution – Health and Safety 1985. HMSO

DIVISIONAL NEWS

NORTHERN DIVISION

Report of visit to the Butterwell Open Cast Site in Northumberland, 7th November 1986

43 Members of the Northern Division visited the Butterwell Open Cast Site, one of the largest in operation in the United Kingdom. The open cast coal is extracted at 1 million tonnes per year, an operation which has been going on for 10 years and will continue for two or three years to come.

The visiting party were given an introduction into the operation of this site and the techniques required when moving such vast quantities of soil and rock and winning coal down to 6 inch seam thickness. Following this explanation, the Members boarded a bus, were taken to the edge of the site and then transferred into Land Rovers to go to the edge of the workings. The open cast operation comprises 2,050 acres and currently the hole is 100 metres in depth; as can be imagined from this size, everything was put into perspective when the largest drag line in Europe looked to be no more than a giant "Dinky" toy. The drag line operation has removed 20 million cubic metres in its box cut across the site.

Following this the Members retired back to the site office where Mr. Alexander, Site Engineer, was given many questions to deal with, following which Mr. P. Stirling, Environmental Health Officer, Gateshead, proposed a vote of thanks on behalf of all the Members.

W.C.B. Robson
Honorary Secretary

EAST MIDLANDS DIVISION

Report of visit to the Incinerator Company, St. Neots, Huntingdonshire, the Cambridge Science Park and Addenbrooks Hospital, Cambridge, 4 September 1986

The Incinerator Company Limited of Eaton Socon, St. Neots, are Industrial Members of the Division, and their Managing Director, Mr. K.S. Dunn was one of the Society's Representatives at the IUAPPA Conference in Australia this year. For that reason he was unable to be present when a Divisional Meeting, which he and I had corresponded about last year, took place at the invitation of the Incinerator Company Limited.

Some fifty five members assembled at the works on 4th September, 1986 to begin what proved to be a most interesting day, supplemented by that most welcome additional benefit, namely bright sunshine.

Mr. Alan Tomkins, a Director of the Company, together with members of the staff, welcomed delegates on arrival and coffee and biscuits were served during the assembly period.

Opening the meeting Mr. J.L. Fear, Chairman of the Division, formally introduced Mr. Tomkins who then extended an official welcome on behalf of the Incinerator Company.

Following a short business meeting, Mr. Tomkins gave a presentation, illustrated by slides, of the data required and the calculations which have to be made in order to design an incinerator which will deal with the refuse for which it is intended and also meet air pollution control legislation. This embraced types and classes of waste, including the calorific value, the category of the waste (solid, semi-solid, sludge, liquid or gas), the analysis, the handling of the waste, construction materials, disposal of residues and the furnace temperature.

Mr. Tomkins also described the two types of Incinerator, namely Free Burning and Controlled Air. The free burning models need after-burners and dust arrestment plant, but in the Controlled air models these are not required because of the controlled combustion arrangements.

Following Mr. Tomkins' presentation, members were shown some incinerators and were also taken through the workshop where the construction takes place.

For the next part of the proceedings members travelled to Trinity Centre, Cambridge Science Park, where the Chairman introduced Professor J.E. Ffowcs-Williams, Rank Professor of Engineering (Acoustics), Cambridge University Engineering Department, who is also an Individual Member of the East Midlands Division.

Professor Ffowcs-Williams gave a most interesting account of the theory and practice of anti sound – the suppression of sound by making another sound exactly the same. Professor Ffowcs-Williams said the subject was 50 years old, the first patent having been taken out by Paul Lueg in 1936. In 1953 Olsen and May conducted successful experiments in America. Two fictional works had been based on the subject – "Silence Please" by Arthur C. Clarke (1957) and "Sea Leopard" by Craig Thomas (1981). The first anti sound silencer had been installed at Duxford in 1981, where two Rolls Royce Aero Engines were being used to pump gas in the mains. These were fitted with the normal detuners but there was still a rumbling noise and windows in dwellings in the locality rattled because of the penetration of low frequency noise. To generate an opposite wave required powerful loudspeakers. To accomplish this 72 of the world's "most powerful disco base speakers" were installed giving an amplification of 12 kW of acoustical power. As a result an attenuation of 15 dB was obtained and the sound was inaudible. The application made possible the attenuation of low frequency exhausts, but although the technology now existed no further applications were known.

Professor Ffowcs Williams concluded this talk with a reference to the Stokes Effect and Leslie's experiment, where it was demonstrated that a bell inside a vessel not only became inaudible when the vessel was evacuated but also when more material – namely hydrogen – was introduced. The explanation of this by Sir J. Herschel was also set out. The theory had led to sources in anti sound being manufactured deliberately, one of which was the Olsen Silencer.

Professor Ffowcs Williams then demonstrated how this could be done using a piece of equipment in which speakers at opposite ends of a cylindrical tube generated the same sound, that from the first being fed into a computer which then controlled the second speaker.

The Chairman thanked Professor Ffowcs Williams for giving of his time to be with us and for a most interesting explanation of the subject. Members then partook of an excellent buffet lunch by kind invitation of the Incinerator Company Limited.

Later members again boarded the bus for Addenbrooks Hospital in Cambridge where in two parties visits were made to the boiler plant serving that very large complex and also to the incinerator plant installed by the Incinerator Company Limited to deal with waste not only from Addenbrooks but from other hospitals in the Cambridge area.

The Division is greatly indebted to the Directors of the Incinerator Company Limited for an extremely interesting and well organised day and for their generous hospitability. In addition it provided a comparitively rare opportunity for a meeting in the most southerly part of the Division.

E.F. Raven
Honorary Secretary

LONDON & SOUTH EAST AND CENTRAL SOUTHERN DIVISIONS

Report on the Annual General Meeting held at Hobart House, London, 17 June 1986.

The 31st AGM of the London, South East and Central Southern Division was held at Hobart House, Headquarters of British Coal, on Tuesday 17 June 1986. 21 Members of the Society were in attendance. The Chairman, Mrs. G.E. Naylor, reported that membership of the Division had increased slightly over the period 1984/85. There were now 16 sustaining members, 26 corporate members, 57 local authority members and 81 individual members.

The report on activities noted that during 1985 visits had been made to the GLC Refuse Incineration Plant at Edmonton, the Thames Flood Barrier at Woolwich, and the Ford Motor Company Research and Engineering Establishment at Laindon in Essex. During 1986, visits were made to the British Coal Research Establishment in Cheltenham – in June, and to May & Baker, Belvedere, Kent – in September.

Among notable landmarks during the year had been the demise of the GLC, including the Scientific Services Branch, in March 1986. The thanks of the officers to that Branch were recorded for the help, expert advice and co-operation shown over the past years. It was gratifying to know that the Branch would continue its work, as London Scientific Services, an agency service of the London Residuary Body set up to look after the interests of the late GLC. In May 1986 Ken Dorman, the Division's Honorary Auditor, had resigned from the Division in order to take up the post of Chief Environmental Health Officer to the City of Gloucester in the SW Division. We wish him every success in his new job and thank him for past services rendered. Finally, the Division had expressed its concern over the proposed lessening of planning controls such as envisaged in the Government White Paper, 'Lifting the Burden'.

After the AGM the meeting was addressed by Mr. T. Henshaw, OBE, of the Marketing Department of British Coal, on, "The utilization of coal and the latest technologies to reduce air pollution." He was assisted by Mr. D.M. Willis also from British Coal.

Professor R.S. Scorer of Imperial College then gave an illustrated talk on, "The use of satellite pictures as an aid to the meteorological studies of air pollution". Both illustrated talks were extremely interesting and very well received.

J.J. Beagle
Honorary Secretary

FUTURE EVENTS

1987

5 – 9 JANUARY 1987 – SHORT COURSE "Industrial Gas Cleaning and Dust Control"

Organisers: The Institution of Chemical Engineers (ICE)
Venue: Loughborough University of Technology
Details: The Conference Section, The Institution of Chemical Engineers, 165-171 Railway Terrace, Rugby CV21 3HQ. Telephone: Rugby (0788) 78214
Also being arranged by ICE, same dates and venue, is a **SHORT COURSE on "Particle Size Analysis".** Details as above.

16 – 20 MARCH 1987 – SHORT COURSE "Industrial Noise"

Organisers: Center for Professional Advancement, The Netherlands
Venue: The Hague, The Netherlands
Details: The Center for Professional Advancement, Palestinastraat 1, 1071 LC Amsterdam, The Netherlands.

25 and 26 MARCH 1987 – NSCA WORKSHOP "Indoor Air Quality – Acceptable Standards and Building Design"

Organisers: National Society for Clean Air
Venue: University of Manchester
The Programme: This Workshop will examine the problems of contamination in the home, offices and in enclosed public spaces (eg schools, cinemas, car parks). The Workshop will review the range of problems in these situations in terms of the pollutants and their impacts on human health, and will culminate in discussion of measures to secure an optimum air quality in the built environment.
Details: NSCA, 136 North Street, Brighton BN1 1RG. Telephone: Brighton (0273) 26313.

6 – 9 APRIL 1987 – International Pollution Abatement Fair – 'The Technology of Environmental Protection'

Organisers: Brintex Limited
Sponsors: DOE, CBI, Commission of the European Communities and the Institution of Environmental Health Officers
Theme: The Fair will be held to mark the beginning of the European Year of the Environment alongside ICE '87 – The Public Works and Municipal Services Congress and Exhibition. The Exhibition will cover all aspects of Environmental protection including water pollution control, air and noise pollution control and monitoring and all aspects of wastes management.
Venue: The National Exhibition Centre, Birmingham
Details: Miss Anna Grabham, Exhibition Organiser, Brintex Limited, 178-202 Great Portland Street, London W1N 6NH. Telephone: 01 637 2400. Telex 262568 G

13 – 16 APRIL 1987 – CONFERENCE "Acoustics '87" – the 1987 Spring Conference of the Institute of Acoustics (IoA)

Organisers: IoA, Southern Branch
Venue: Management Centre, Portsmouth Polytechnic
Call for Papers: Papers are currently being sought on the following topics: new work in musical acoustics; low frequency noise and vibration in buildings; acoustical aspects of environmental impact assessment; model analysis of vibrating systems; assessment of hearing damage in industry; developments in physical acoustics. 200 word abstracts should be submitted as soon as possible to: The Technical Programme Co-ordinator, I.J. Sharland FIOA, Pinecroft, Airlie Road, Winchester, Hants SO22 4NQ.
Details of Conference from: Conference Organiser, Prof. J.A. Powell FIOA, School of Architecture, Portsmouth Polytechnic, Portsmouth, Hants.

5 JUNE 1987 – SEMINAR "Effects of Noise in a Rural Environment"

Sponsors: IEHO, South Western Branch, and NSCA, South West Division
Organiser: Michael Latham, Cornwall College
Venue: The Council Chamber, New County Hall, Truro, Cornwall
Programme: Will cover counselling on noise complaints; the noise impact of a container port; noise from domestic appliances; discotheque noise; industrial noise and the rural environment; aircraft noise; the use of helicopters for emergency services; railway noise; noise and wind generators; and control of motorcycle noise.
A Call for Papers has been issued – for this and other details, contact: Mr. M. Latham, Noise Laboratory, Cornwall College, Redruth, Cornwall TR15 3RD.

23 – 29 JUNE 1987 – EXHIBITION "3rd International Environmental Control, Measuring and Testing Equipment Exhibition"

Organisers: SHK International Services Ltd.
Venue: China International Exhibition Centre, Beijing, People's Republic of China.
Details: Anna Small, Engineering Industries Association, 16 Dartmouth Street, London SW1H 9BL.

30 AUGUST – 4 SEPTEMBER 1987 – INTERNATIONAL CONFERENCE "Acid Rain – CALL FOR PAPERS

A major international conference on acid rain is to be held to draw together those working on the wide range of air pollution phenomena involved, and encourage vigorous exchange of information between scientists and engineers. Ultimately, control strategies and their technological and economic implications will be discussed.
For further information or submission of abstracts, please contact any of the following: Prof. R. Perr

Prof. R. Perry
Acid Rain Conference Secretariat
Public Health and Water
Resource Engineering
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Dr. Dan Smith
Dept. of Civil Engineering
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Edmonton
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INDUSTRIAL NEWS

More Analysers for the UK Ambient Network

Analysis Automation Ltd have recently received further orders from Warren Spring Laboratory to supply high sensitivity NOx analysers for use in conjunction with the United Kingdom Ambient Monitoring Network. This brings to 16 the number of units of various types so far supplied and are the only British manufactured analysers in the scheme. These analysers are specifically designed to meet the unique requirements of Warren Spring Laboratory for monitoring in remote, rural areas where sensitivities of much less than 1 part per billion are necessary.

Reader Enquiry Service No. 8649

New Design WIRLAX Low NOx Burners Launched by Airoil Flaregas

Airoil-Flaregas have redeveloped their Wirlax range of Natural Draught Gas Burners to provide significant reductions in NOx emissions.

Encouraged by a major Refinery in West Germany Airoil-Flaregas carried out discrete modifications to a Wirlax 10 gas burner, identical to those installed on a number of process furnaces. The operator's requirements were to substantially reduce NOx emissions from existing levels, and to operate the existing burners at reduced liberation whilst maintaining minimum excess air levels and overall efficiencies.

The final results were NOx emissions reduced by 50% of the previous best, with greatly improved burner turndown and stability. Also by utilising two differing gas nozzles, excess air levels of 10% can be maintained over a wide turndown.

Reader Enquiry Service No. 8650

General Electric (USA) and John Brown Sign FGD Technology Licence

John Brown and General Electric (USA) have reached agreement to cooperate for the supply of GE's flue gas desulphurisation (FGD) technology.

Currently, there are 92 installations in the USA, Japan, West Germany, Austria and the Netherlands, with an equivalent electric capacity of over 29,000 MW, which incorporate GE's flue gas desulphurisation technology. Outside the US the FGD technology has been supplied through a network of successful local manufacturing licensees which will now include John Brown.

Reader Enquiry Service No. 8651

Casella Opens Birmingham Office

Casella Ltd has just announced the opening of the first in a series of regional environmental consultancy offices in Birmingham.

The Company's philosophy is one of total support to industry in a local area. The environmental consultancy team are able to provide advice, analytical services and prepare reports on every aspect of the environment.

Reader Enquiry Service No. 8652

So nice to come home to-

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On shivery nights it's so nice to come home to a Coalite fire. Coalite lights easily, burns beautifully with no smoke, soot or sparks. No wonder more and more people are turning to the open fire—and to Coalite.

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Reader Enquiry Service No. 8640

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Reader Enquiry Service No. 8641